

**Radio Control**

**HPI RS4 PRO**  
**CAR OF THE YEAR!**

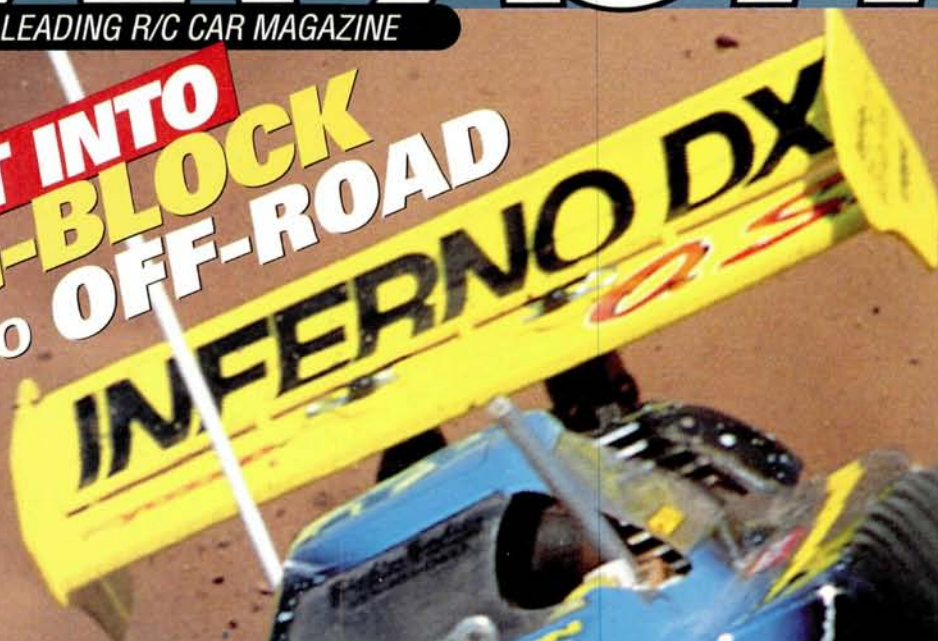


# CAR ACTION

THE WORLD'S LEADING R/C CAR MAGAZINE

July 1998

**GET INTO  
BIG-BLOCK  
OFF-ROAD**  
KYOSHO  
DXII



**FIRST LOOK!**  
**TEKIN'S  
SMART  
G10 ESC**

**HOW TO  
MAKE THE MOST  
OF YOUR MODIFIED  
MOTOR**



**Cactus Classic Off-Road  
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**ROAD RIOT!**

**TAMIYA TGX VS. KYOSHO SUPER TEN**



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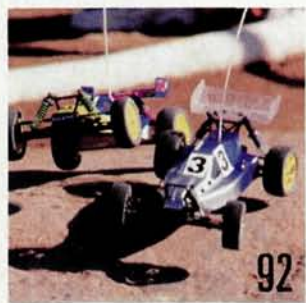
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ON THE COVER: HPI's RS4 Pro, R/C Car Action's 1998 Car of the Year; the Inferno DXII does its dirt-churnin' thang; Trinity's D3 muscle mod; Tamiya's TGX Mk.I puts a move on Kyosho's Super Ten. (All photos by Walter Sidas.)

## It used to be easier ...

... Each year, one car would stand above the rest in technical innovation, performance and/or sheer popularity, and this car would be an easy pick for Car of the Year. This year, we're happy to say it wasn't so easy. Happy? Of course. When we have a hard time nailing down Car of the Year, it means there were a whole load of contenders up for the spot, and that means there are a lot of great cars out there for you. Team Losi's Street Weapon and XX-4 were up there, as was Yokomo's YR4M2—all excellent machines. However, HPI's RS4 Pro was the car we picked, and when you read this year's installment of **Car of the Year**, we think you'll agree with our choice.



If a more narrowly focused competition whets your R/C appetite, our **Super Nitro Tourer Shootout** is all you need. We've built stock and modified versions of Tamiya's TGX Mk.1 and Kyosho's Super Ten 1/8-scale (kinda) racers for the ole head-to-head blowout. If you've been considering either of these hot machines, well, this piece should make up your mind.

Of course, nitro isn't for everyone (I'm an electric guy myself), and we have a "First Look" just for you Ni-Cd-powered racers. This month, the **Tekin G-10** ESC goes under the microscope. This programmable-without-a-programmer speed control has been the topic of rumors and Internet posts for weeks, but we have the straight dope on the latest in the G-series. This might be your next ESC, or it might belong to the guy who beats you.



One breed of racer who probably won't be buying a G-10 (or any other ESC) is the drag racer. Get into the world of 18-cell land torpedoes with on/off switches for throttles and O-rings for tires with our **Drag Racing 101** feature. If you've ever wondered what it takes to break 80mph in less than 150 feet, this is your chance to find out.

Longtime readers of *Radio Control Car Action* will no doubt remember former Executive Editor Steve Pond, who helmed the magazine from 1988 through 1991. **He's back!** Steve has rejoined the team as a Senior Editor; with 17 years in the hobby, Steve represents a wealth of knowledge and experience that will be passed down to you through each issue. Welcome back, Steve ... oh, and by the way, the new guy has to buy the editors lunch for a week—company policy.

That's enough of me. Get to the good stuff.

*Peter Vieira*

Peter Vieira  
Editor



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100 East Ridge, Ridgefield, CT 06877-4606, USA



## If You Like my Body ...

Great job on the May issue! All my friends and I are into monster trucks, and we thought the Bennett versus ESP shootout was awesome. We know Parma makes the bodies you used, but what models were they? Who painted them? [email]  
STAN COHEN

The bodies are Parma's 10388 Dodge Ram (modeled by the Bennett truck) and the 10199 Big Foot (featured on the ESP). Our assistant editor, Greg Vogel, handled the airbrush.  
—Pete

## Ode to a Nitro RS4

I wanted to write and say how great the HPI Nitro RS4 is. I bought this indestructible car three weeks ago and have been amazed ever since. Let me tell you a story ....

I was out behind my local hobby shop, practicing for a race. I had gone through two or three tanks of gas, and that's when it happened: I entered the straightaway, with the pedal to the metal. I realized I had no control when a friend asked, "Where are you going?" just as I started ripping across the parking lot. I screamed, "I have no control, this is going to hurt!" The car made a straight line at full acceleration for 200 yards until a brick wall stopped it cold. The car slammed into the wall, went about three feet in the air and landed on its back.

The car was still running, though, even on its back at full throttle. I ran to it as fast as I could, but just as I picked it up, it

died. My friend and I figured the car was shot, but out of the darkness, there came hope: the car looked fine. I started it right back up and was running with the big boys again.

I just want to say, I love my HPI! TROY G.  
Converse, TX

## Running on MT

I read the "First Look" on the HPI RS4 MT and bought one shortly afterward. Since the article was a first look, you really didn't say how it ran. Can you tell me your thoughts on it, and maybe point me in the right direction as far as some worthy hop-ups? Will there be a full Thrash Test soon? [email]

CHRIS SPANGLER

Chris, I've been bashing my MT around for months and have grown very fond of it. The MT handles like a touring car on-road and can tear up an off-road track like a 4WD buggy.

I've hopped it up extensively since I purchased it. I highly recommend that you install a complete set of ball bearings; front universal swingshafts and a rear ball diff are also worthy hop-ups for the MT. I also installed a one-way diff in my truck's front gearbox, and I've found that the truck is much faster on the top end and seems to carve through corners with greater authority. In short, I love my MT and plan to race it until the wheels fall off.

The official "Thrash Test" of the HPI RS4 MT is already in progress; look for it soon!  
—G-Man

## I Believe I Can Fly

What's the difference between a light and a heavy flywheel for nitro engines? [email]  
Snag397

Snag, I've been guilty of trading in my stock flywheel for a lightweight model in the past, but years of experience have taught me otherwise.

The benefit of using a lightweight flywheel is that it has less rotating mass. This lower mass results in quicker acceleration, which is what we all strive for in our racing pursuits—or so we think. You must keep in mind that every change we make to our cars, even for the best reasons, will have an effect somewhere else on the car, and it's not always positive.

The lightweight flywheel can make it very difficult to get your engine to idle smoothly, and can make it accelerate *too* quickly, which makes the car harder to control. Heavier flywheels have more rotating mass to help keep the engine running at idle. The biggest benefit, however, is that the extra weight tends to smooth acceleration; this makes the car easier to control. Nine times out of 10, I've turned quicker lap times with a heavy flywheel than with a lighter one. The car may *look* faster with a light flywheel, but we aren't racing for style points; we're racing against a clock.

The one time out of 10 that I was faster with a light flywheel, there was unlimited traction and I could use every ounce of power.  
—Steve

## Beginner's Blues

I recently bought a Megatech Nitro 4WD touring sedan; this is my first nitro-powered car. My first problem with it is that I can't get the engine to idle for more than 15 seconds; my second problem is that I don't have enough experience to know when the engine is properly adjusted. The owner's manual suggests that I start at 2½ turns, but when I do that, the car goes through tons of fuel. I

**WRITE TO US!** We welcome your photos, drawings, comments and suggestions. Letters should be addressed to "Letters," Air Age Inc., *Radio Control Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

### INTERNET ADDRESSES:

Chris Chianelli: [chrisc@airage.com](mailto:chrisc@airage.com)  
George Gonzalez: [georgeg@airage.com](mailto:georgeg@airage.com)  
Peter Vieira: [peteriv@airage.com](mailto:peteriv@airage.com)  
Steve Pond: [stevep@airage.com](mailto:stevep@airage.com)  
Greg Vogel: [greg@airage.com](mailto:greg@airage.com)

haven't been able to drive it with the body on because it's giving me so much trouble. I feel hopeless! Please help me!  
ALFREDO OVERMAN  
Bronx, NY

Alfredo, don't think you're alone. This is likely the most common problem with anyone new to nitro engines. The owner's manual is referring to the *main* needle—not the idle-mixture screw—when it says to open it up to 2½ turns. Adjust the main needle (the large thumbscrew on the same stem as the fuel inlet) about 2½ turns out. The idle-mixture screw should be adjusted about 1 to 1½ counterclockwise turns from the closed position. This screw is at the end of the carburetor where the throttle linkage attaches. Some fine-tuning may be required once you get it started, but these settings should get you going. When it's properly adjusted, the engine should be able to idle for about 1 minute. If the engine slows and finally stalls from an idle, it's still too rich and the *idle* needle needs to be closed more (turned clockwise). If the engine speeds up slightly before stalling, then it's too lean and the needle needs to be opened (turned counterclockwise).

Make sure that before you even try to start the engine, you have a fresh battery in your glow starter, and replace the glow plug with one that is medium temperature. Even if the glow plug glows red, it has been fouled from running the engine too rich. Good luck!  
—Steve

JR's new XR2 has to be one of the best radio values to come along in quite some time. Here are just some of its features: 2-model memory, easy-to-read LCD display, 3-digit model-name entry, electronic digital trim levers for throttle and steering, two assignable electronic grip levers, sub-trim, steering dual rate, steering endpoint adjustment, charging jack for Ni-Cd batteries (not included) and voltage readout with low-battery alarm.

One of my favorite things about this radio is what I call the IFBRO (instant feedback/readout) feature. With it, changes made on the digital steering trim, digital throttle trim and digital grip levers (A and B) are immediately

## JR XR2

*Affordable Performance*



shown in large characters on the display screen without your having to access the programming via the mode/entry button.

But my favorite feature of the XR2 is its price. You'll get all these features in a radio manufactured by a company known for its high-quality products for a street price of only \$120. Now, that's value, and that's very cool in my book.

A version with one servo and a Dynamite Power Pulse electronic speed control will be available for about \$150.

Both systems feature a JR R-122 receiver (with patented ABC&W interference rejection) and the 40.3 oz.-in.-torque Z250 servo.

For more information, contact Horizon Hobby Distributors Inc., 4105 Fieldstone Rd., Champaign, IL 61821; (217)

355-9511.



**EXCLUSIVE!**

## HPI and Team Orion join forces!

*Here's the straight dope from HPI*

**H**PI and Team Orion have announced a strategic alliance that will combine the strengths of both companies into a worldwide force in the competitive R/C racing arena. The first step will be to field a racing team for the upcoming IFMAR World Cup for Touring Cars. The combination of the HPI RS4 Pro (1998 R/C Car Action Car of the Year) and the world-famous line of Team Orion batteries and motors should make for a very strong team. Team driver Oscar Jansen has already shown that this is a winning combination by taking first place at a recent touring-car event in Dortmund, Germany. Stay tuned for more information on the alliance between Team Orion and HPI Racing.

Wow! Can you say "big-time touring-car team"? We've also heard that Darren Westman, late of Reedy Modifieds, has joined HPI to work with Oscar Jansen and develop their motor line. This is big news, people.

## Parts is Parts

For many years, accessory companies have provided aftermarket high-performance accessories for Team Associated (TA) cars and trucks. By the time you read this, Team Associated, under the banner of "Factory Team," should be well on the way to manufacturing a home-brewed selection of performance options for its cars. The designs of these parts will mostly come from the same brilliant minds as invented the vehicles themselves. With TA's reputation for exhaustively testing everything it builds, look to see these accessories dominate the racetrack!



## Associated is Goin' Left!

From the fertile minds of the R&D team at Associated Electrics comes the most versatile oval racing 10L ever to make a left-hand turn. The new RC10L3 Oval features a host of design innovations that could

change the face of oval racing. The 10L3 features an all-carbon graphite chassis with wider battery slots that allow side-to-side adjustment of the battery's position by up to 1/2 inch; in-line axle front-steering blocks for quicker steering response; two wheelbase settings to allow shortening of the chassis by 1/4 inch; new Factory Team blue titanium turnbuckles; energy-absorbing foam bumper; and an entirely new rear pod design.

The rear pod is a triple-shock setup that eliminates the need for the twee screws that have been so common on the 10L variants. Two Volume Compensating System (VCS) Micro-Shocks handle the side-to-side damping, while a larger, fully composite VCS Macro-Shock handles the up-and-down damping. The rear pod can be offset 0.275 inch to better handle flat-track racing.

The kit, according to Associated, also includes a Team graphite rear axle, clamp-style lightweight rear hubs and Jaco special-compound tires mounted on lightweight composite wheels. A line of specialized high-performance options is also scheduled to be available when the 10L3 is unleashed!



TRINITY'S TANGERINE DREAM!

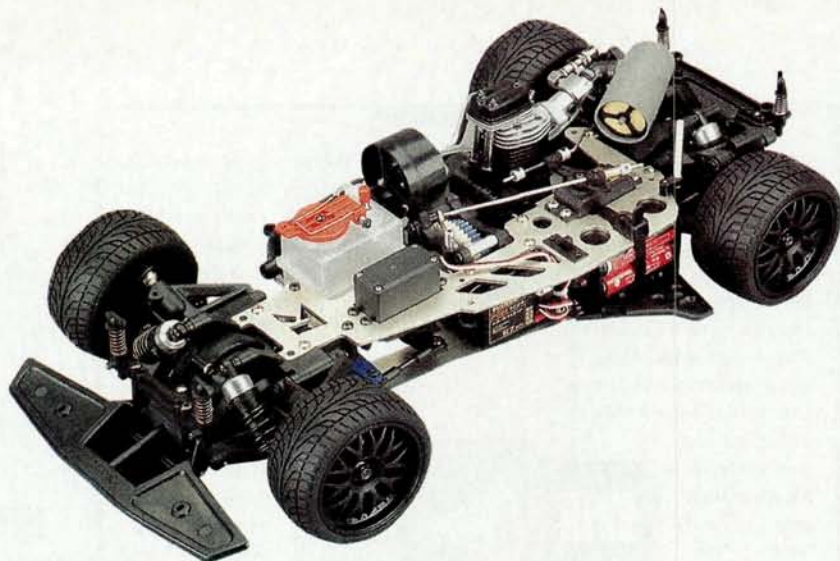
Trinity now offers David Spashett's Tangerine Tyre Tack (TTT) that is specially formulated to last 8+ minutes on the high-horsepower 6-cell 1/12- and 1/10-scale carpet racing machines. TTT is ideally

suited to use on foam and natural-rubber on-road tires (OK, tyres). It provides super-high traction, but doesn't cause the premature tire wear associated with the wintergreen-based traction compounds.



**FLASH !!!**

Associated driver Josh Cyrul joins Team Trinity.



## Super Ten Four II—Hike!

**T**he Kyosho Super Ten nitro-powered racer—featured in this issue—appears to have a nearly identical twin overseas. We unearthed information that seems to indicate that the Super Ten's latest incarnation is the Four II. If the Four II comes equipped as shown, it appears that Kyosho is taking a stab at powering the Ten with a 4-stroke engine! The engine pictured is an O.S. FS26-SC (I assume the "C" has something to do with a "car" application) that was made popular in the R/C airplane hobby. Also mounted in the car is a 2-speed transmission and a high-speed cooling fan (currently optional on the 2-stroke version). We're not sure if this 4-stroke Super Ten will ever be imported to the USA. When we know more, you'll know more!

# U.S.

# INDOOR

## Championships

Nine Times Joel "Magic" Johnson has been crowned the **U.S. 4 Cell Indoor Champion**. No other driver has been able to win the title more than twice. In fact it would take the next six winners totals just to equal Joel's domination of this event.

The **D3** modified motors, **VIS EX-TRA** Sanyo-RC-2000 battery packs and **Switch Blade 12sj** that helped Joel win his 9th title can help you win your first!

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## Pro-Line's V-Rage *Pushing the Limit of Performance*

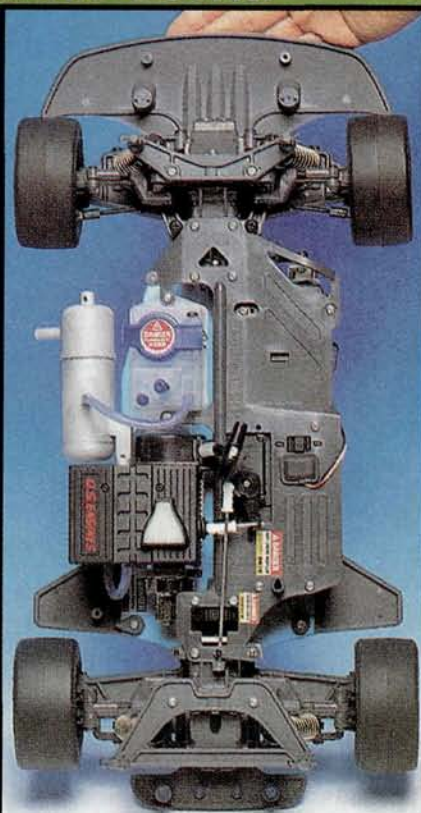
**P**ro-Line has added a new player to its line of successful touring-car treads. V-Rage sedan tires are available in standard width and in Pro-Line's S2 and S3 rubber compounds. The profile of the V-Rage matches that of the current LP Sedan Slick with a low-profile carcass. The shallow tread gives an aggressive directional look without sacrificing any traction.



## TAMIYA'S LAYIN' DOWN!

**Hot off the presses:** it appears that Tamiya will soon offer another 1/10-scale, nitro-powered touring car. So what's the big deal? The big deal is that this car is designed around the revolutionary O.S. .12LD engine. The O.S. .12LD is a unique design in which the engine mounting is in a laydown configuration (hence the designation "LD"), as opposed to the upright cylinders we are used to seeing on conventional engines.

The new Tamiya car, we discovered, is called the TGX-Mk.1 TS. It's designed to accommodate the pull-start and bump-start versions of the LD engine. With this engine, the car will have a lower center of gravity for improved handling.



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- 9218 Opal, (10 Triple)
- 9219 Platinum, (13 Triple)

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## Rammer PS

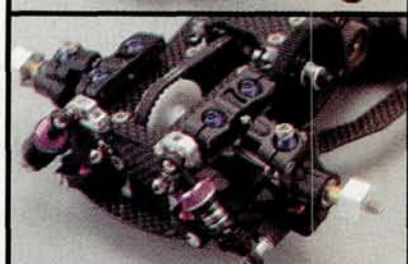
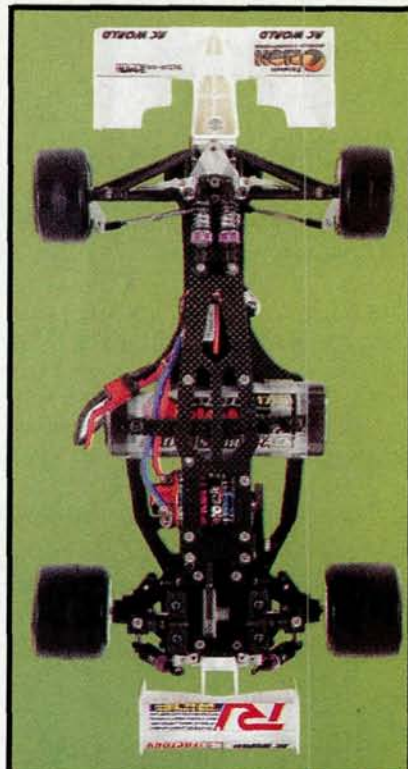
**D**ahm's new Rammer PS Drag Body is based on the popular Rammer SS, which was extensively wind-tunnel tested during development. The PS version has been given a Pro Stock hood scoop, a Pro Stock Wing and dual parachute packs for that all-out Pro Stock "street fighter" look. The PS was specifically designed for the Fine

Design Pro Stock chassis (200mm), HPI RS4 (wide), Parma's Hemi Vette and '29 Ford Roadster chassis, Associated's RC10SS, Trinity's Evolution SS and most other narrow, 1/10-scale, superspeedway chassis. For more information, contact Dahm's Racing Bodies, P.O. Box 360, Cotati, CA 94931; (707) 792-1316; fax (707) 792-0137.

## Megatech Nitro Pro 911

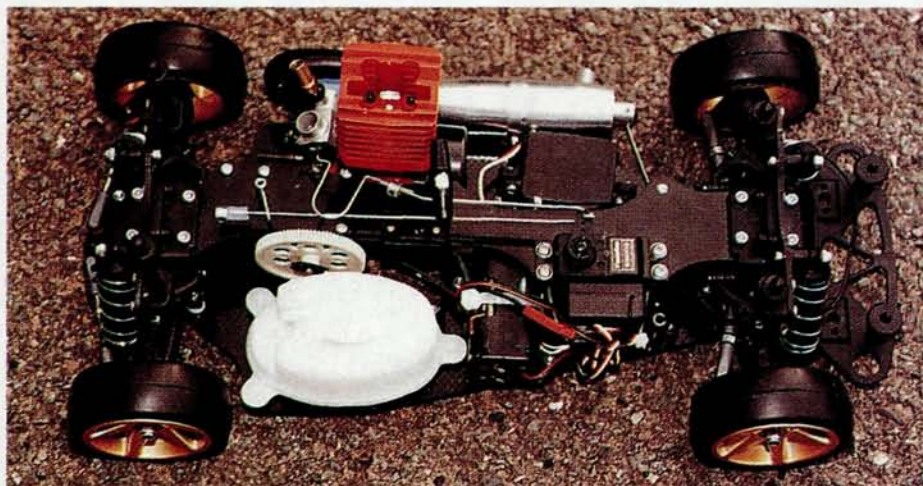
This is Megatech's Mindy Winston (of Winston Cup lineage, I'm told) with the new, feature-loaded, 1/10-scale, 4WD Nitro Pro Touring Car; it sports a new Porsche 911 GT-1 body. Its features include: 2-speed transmission with steel main gears; countersunk chassis holes for flush screws; full ball-bearing set; static ride-height adjusters at all four corners; front and rear universal half-shafts; tuned pipe; universal engine mount and clutch shaft that accepts all popular .12 to .16 side- or rear-exhaust engines with rotary or slide carburetor; purple-anodized chassis; radio plate and shock bodies. The street price for this "full option" car will be about \$220.

For more information, contact Megatech High Performance RC Products, 8300 Tonnelle Ave., North Bergen, NJ 07047; (201) 662-8500; fax (201) 662-1450.



## UFO F1

This unidentified F1 car comes to us from the Orient. It features a double-decker graphite chassis with a mid-motor setup. The rear wheels appear to be driven by a short belt connected to a spur-gear jackshaft. What makes this particular car very interesting is the design of the suspension. The UFO (for lack of a proper name) features 4-wheel independent suspension of the double A-arm variety. A unique feature is that the car is equipped with inboard oil-damped shocks that are compressed via a cantilever design. As always, stay tuned for more information!



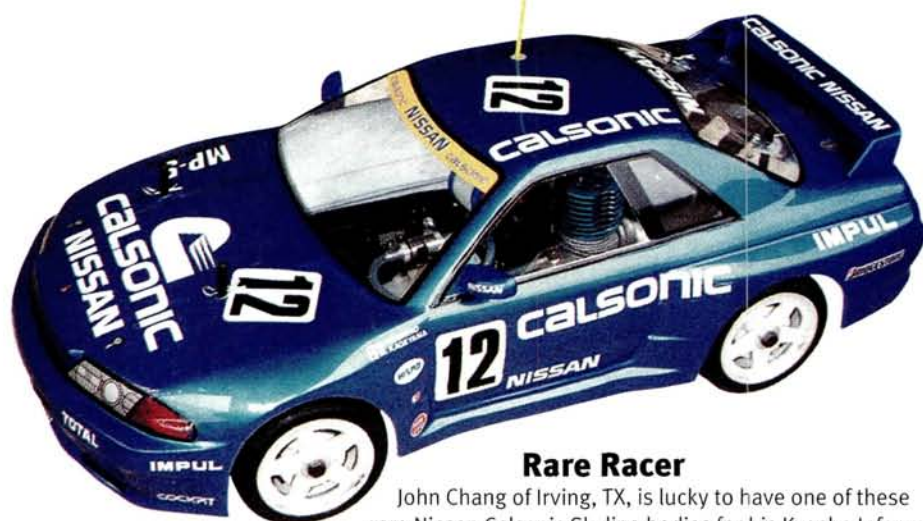
## Schumacher Asphalt Assault

Schumacher Racing has just released photos of its latest entry in the touring-car class: a nitro-powered version of the SST 2000. The photo that we received of the prototype features a graphite double-deck chassis that harnesses the power of an O.S. .12 engine. Schumacher was quick to point out that it hasn't yet determined which engine the car will ultimately be designed for.

# READERS'

# rides

"Readers' Rides" is our way of recognizing the unique, innovative—and sometimes bizarre!—vehicles that our readers have created. Send us a sharp, uncluttered, well-exposed color photo of your car or truck (no Polaroids, please!), along with a brief description, to Readers' Rides, R/C Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. If we choose to feature your creation, you'll receive a 6-month subscription to Car Action, or an extension of your existing subscription. You'll also be eligible for the eighth annual "Readers' Rides of the Year Contest" in the fall of 1998. The winner will be awarded \$500. In case we need to contact you, write your address and phone number on your letter and on the back of every photo you send. Good luck!



## Rare Racer

John Chang of Irving, TX, is lucky to have one of these rare Nissan Calsonic Skyline bodies for his Kyosho Inferno MP5. John says that the 25-inch body was made in 1993 and took three cans of spray paint to finish. Mounted on the MP5 chassis is a .21 Picco P-6 engine equipped with an O.S. T2010 tuned pipe and a 16-tooth clutch bell. Other neat features include an MIP temperature gauge, Futaba 3PJ radio and S9304 and S9402 servos. The tires and rims were special-ordered from Europe. John says his big Nissan is probably the only one of its kind in the United States.



## High Hauler

Chris Hintze of Mankato, MN, uses his Tamiya Clod Buster to pull his trailer and Associated RC10LS. The Clod has a Clodzilla III racing chassis, Novak ESC, Pro-Line tires and Trinity Midnight motors. The 10LS uses a Novak 828 speed control hooked up to a Reedy modified motor, and Pro-Line Road Hawks grip the ground. The trailer is custom-built using a variety of materials. The rims are Tamiya with Road Hawk tires. Chris plans to add back-up lights and an automatic door to the back.



## Nitro Sprinter

This nitro sprinter really tears up asphalt and dirt. Bob Hartung of Dublin, OH, sent this photo of the Custom Works sprint car that he converted from electric to gas with a custom Competition Research & Development kit. An O.S. 12 really lays down the power, while a Futaba PCM radio and



servos take care of the controls. Bob built the car, painted and decaled the body and slightly modified other parts for maximum performance. But he didn't build it just for show; he races it as often as he can all summer long.

## Ragin' Racer

Kris Sotiros of Kelowna, British Columbia, Canada, loves to race his Associated T2 on indoor carpet tracks as well as outdoor off-road. His truck features Lunsford titanium upgrades, an RPM molded gear cover, MIP shock shafts, Robinson Racing gears and Pro-Line tires for both types of track surface. The juice flows from a Nuclear Power 1700mAh pack to an LRP ESC to a Reedy Sonic II motor. All the commands come from Hitec radio gear.

## Modern Day Legends

Johnny Nichols of Black Hawk, CO, enjoys running his Bolink Legends whenever he can. The yellow- and red-scheme cars remain relatively stock. Both machines feature Futaba radio gear, Tekin Rebel ESCs, Kimbrough servo-savers and Deans plugs. The red-and-green Legend also has a DuraTrax bearing kit, Bolink springs, PSE gears, Trinity T-Tech motor and an Ex-Tech battery. It must be a blast to drive with such a fast motor. Nice work, Johnny.



## Ready for Racin'

Sonny Utterback of Indianapolis, IN, just picked up a couple of new bodies and slapped on some fresh paint. Sonny is ready for the new race season. His Double-X 'CR' and Double-XT 'CR' are equipped with Novak speed controls and Mercury receivers. Both also have Lunsford Punisher tie rods and Pro-Line wheels, tires, RPM hop-ups and Trinity motors. Good luck racing, Sonny; those bright bodies will really stand out on the track.



## Nitro Hummer

Renoir Valenti of Palmdale, CA, wasn't satisfied with the stadium-truck look of his Nitro Rustler. The first item up for change was the body. The body mounts were modified to fit the ABS Tamiya Hummer body, which was painted in white like the street versions. The wheels were next. HPI truck rims with Pro-Line tires are mounted on all four corners. We bet the Hummer looks good with a trail of smoke and a rooster-tail of dirt behind it!



## Superspeedway Truck

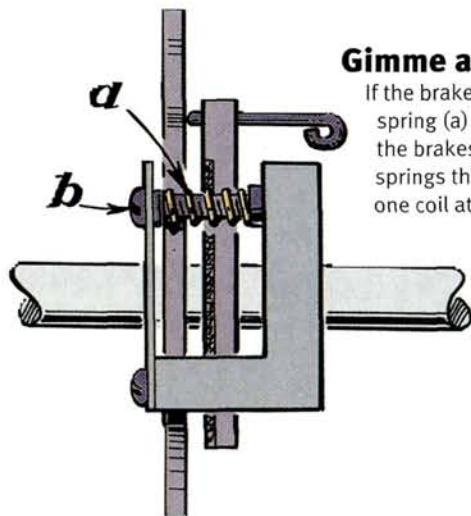
William Turk of Euclid, OH, owns this beautiful Associated 10L Super Truck and races it every weekend. The truck is powered by a Trinity X-Star motor and Novak Tempest ESC. The guidance comes from a Futaba 1024 PCM radio and receiver. The Dahm's Tornado body was painted in a Hooters scheme using Pactra paints and Slix decals (the decals were slightly modified to fit the super-truck body). William says he has been away from the hobby for six years but he has come back and is running strong. Welcome back!

## PIT

workshop ideas &amp; innovations

BY JIM  
NEWMAN

## tips

**Gimme a Brake!**

If the brakes drag on your RS4 Nitro, fit a light spring (a) over the 15mm screws (b) to return the brakes to the OFF position (try ballpoint pen springs that have been cut down to four or five coils). Experiment by removing one coil at a time, then readjust the brakes to the factory specs. This should work well on other cars, too.

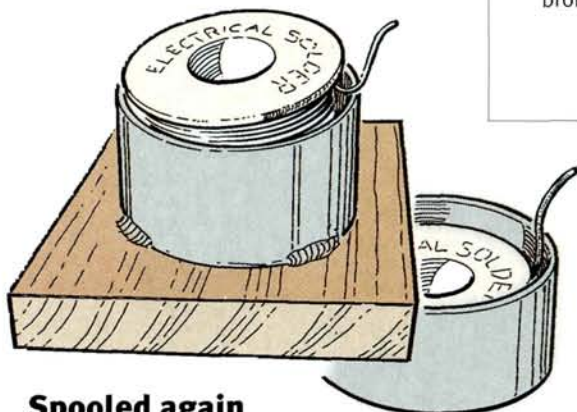
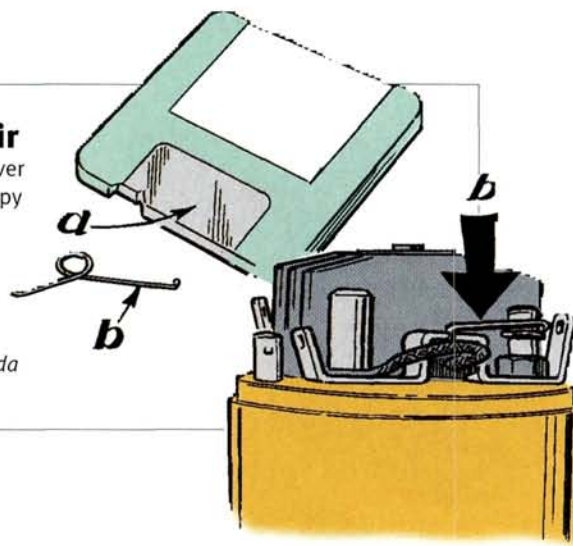
CHUCK LEONARD, Gibbsboro, NJ

Radio Control Car Action will give a one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send a rough sketch to Jim Newman, c/o Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. We're unable to publish many good tips because we don't have the sender's name and address. Please note: because of the number of ideas we receive, we can neither acknowledge every one, nor can we return unused material.

**Spring in the Air**

Remove the metal bottom cover (a) from an old computer floppy disk, then remove the spring (b). Use it as a temporary replacement for a lost or broken motor-brush spring.

RUSSELL LEAR,  
Kelowna, BC, Canada

**Spooled again**

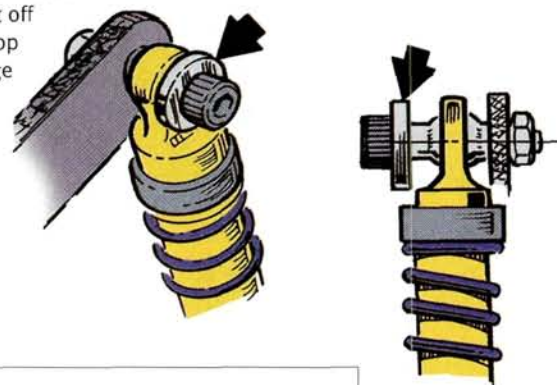
Hot-glue a suitable spray-can cap to a heavy base. Drop your spool of solder into the cap, then bring the strip of solder up between the cap and the spool. Now you can feed the solder out as needed, and the spool remains under control ... no more rolling off the bench.

JOSEPH SOROCHMAN, Anaheim, CA

**Pop goes the Shock**

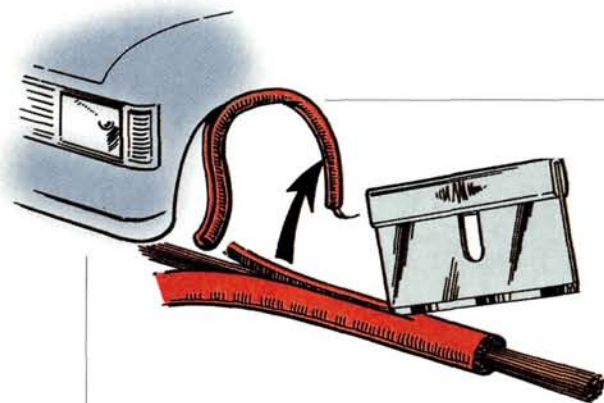
A heavy landing can cause shocks to pop right off the ball joint. To stop this, just add a large washer (see arrow).

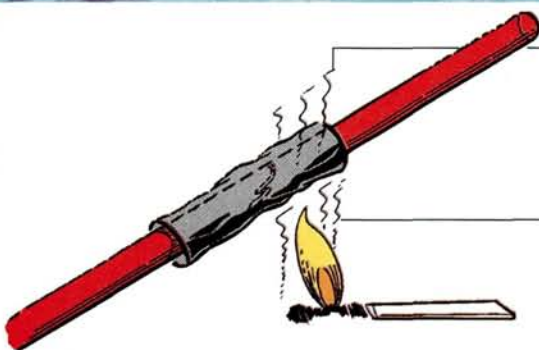
JOSE RODRIGUEZ,  
Chicago, IL

**Tube Trim**

This simple trim reinforces the wheel openings and protects them from cracking. Split the insulation of 16-gauge auto wire, then discard the wire. Glue the split tubing around the openings with thin CA applied slowly and carefully. The wire comes in several colors; take your pick!

JIM and AUSTIN JOHNSON, Vestal, NY





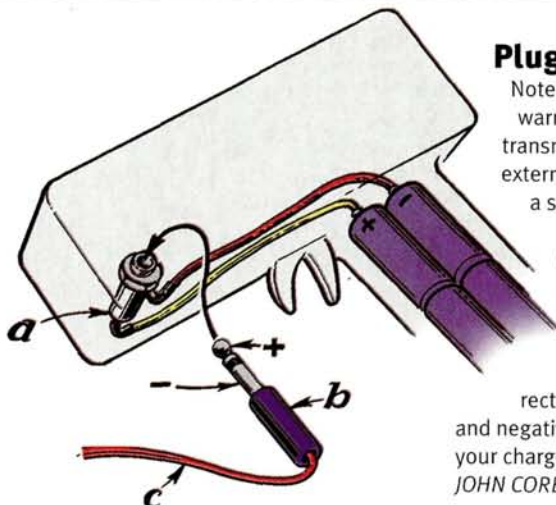
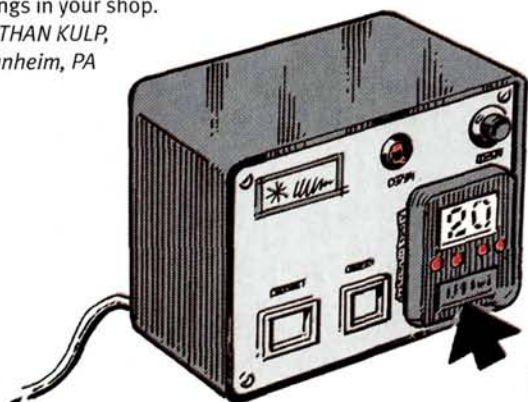
## Hot Tip, too

If your antenna tube breaks and you don't have a spare with you, splice the broken pieces together with a piece of heat-shrink tubing.  
*KEITH KIDNEY, Minot, ND*

## At the Sound of the Tone ...

Use double-stick tape to add an inexpensive, battery-powered timer to the front of your simple charger. Set it to count down the time it takes to fully charge your packs, then start the timer when you press the "charge" button. The timer's beep or chime will tell you when your pack is charged; no more "clock watching" when you could be doing more interesting things in your shop.

*NATHAN KULP, Manheim, PA*



## Plugged In

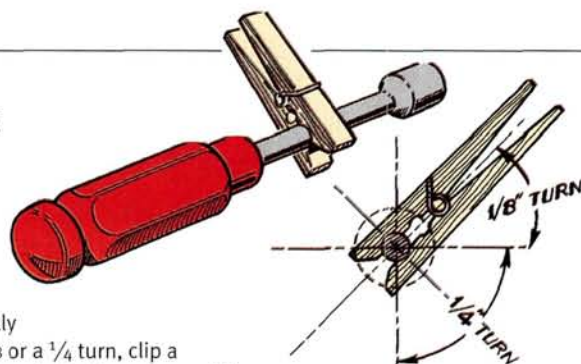
Note: use this tip *only* if your warranty has expired! If your transmitter doesn't have an external charging plug, pick up a suitable mini phono plug (a) and jack (b) from RadioShack; then find a suitable spot on your transmitter case to drill and wire it in. Be sure to observe correct polarity of the positive and negative. The lead (c) goes to your charger.

*JOHN CORBET, Sydney, Australia*

## Clip Joint

Sometimes, instructions tell you to "Tighten the screw an  $\frac{1}{8}$  of a turn." To quickly estimate an  $\frac{1}{8}$  or a  $\frac{1}{4}$  turn, clip a clothespin to the shaft of your screwdriver or nut driver; the clothespin will amplify the amount of movement seen and will serve as a pointer.

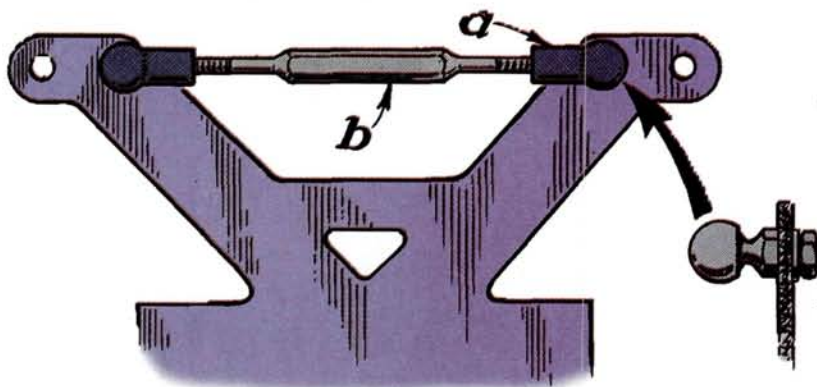
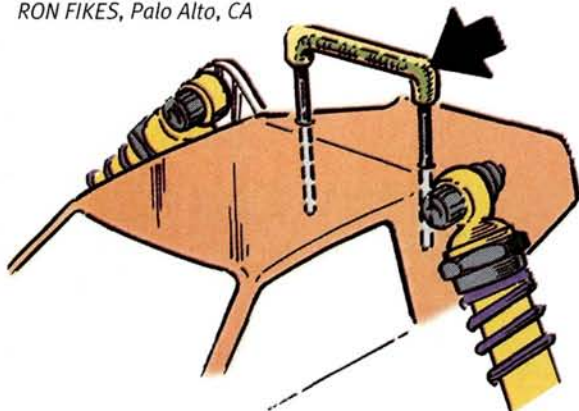
*MICHAEL WONG, Tarrytown, NY*



## Roll your own

To protect the paintwork when his car rolls over, Ron removed the wing and put a roll bar in its place. The roll bar is constructed of .078-inch (2mm) wire and rubber fuel tubing and is then plugged into the wing-wire holes. (To prevent wear on the shock bolts, other drivers have also attached a roll bar to the front shock tower.) Make the rear bar about  $\frac{3}{4}$  inch (20mm) taller than the cab.

*RON FIKES, Palo Alto, CA*



## Brace up

Drill each end of your shock towers to accept a suitable ball joint (a), then fit an adjustable turnbuckle (b) across the top of each shock tower so it's solidly braced. These towers take a beating and often break during a day of heavy racing. This modification will save you a lot of trouble.

*ED MUSCOTT, Cheboygan, MI*

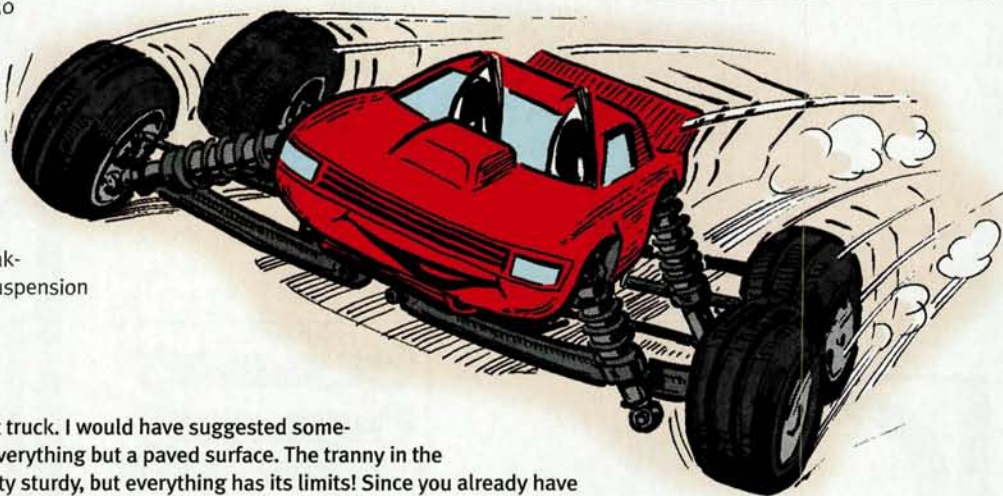
If you have a technical problem that your hobby shop or racing friends can't resolve, give us a shout at *Radio Control Car Action*, and we'll see if we can chase down an answer for you. Questions should be of a technical nature and should be addressed to *Troubleshooting, Radio Control Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606. We regret that, owing to the tremendous number of letters we receive, we can't respond to every one.

## Go Wide!

I recently bought a Tamiya Ford F-150 4WD race truck and a Speed Gems 11-turn Topaz modified motor. I thought that motor would be ideal for this truck, but it's way too powerful! It spins the tires so much that it's hard to steer, and the truck rolls over way too easily at high speeds. Is there any way to make the truck more stable, like making it wider with longer axles and suspension arms? Please help!

JUSTIN PICKETT

Mission Viejo, CA



That's an awful lot of motor for that truck. I would have suggested something a little tamer, especially for everything but a paved surface. The tranny in the TA-02 series cars and trucks is pretty sturdy, but everything has its limits! Since you already have the motor, however, you can "de-tune" it a little bit to calm things down. To set the timing to zero degrees, loosen the screws that hold the endbell, then rotate the endbell until the brushes are centered over the magnets. If the motor is still too powerful, have a knowledgeable friend or the folks at the local hobby shop install some half-height cut brushes to reduce amp draw. The motor will produce less torque and be a little softer off the line; you'll also get longer runs. If that's still too much "go" power, swap the mod motor for a milder modified or stock motor.

To reduce rollover, lower the ride height a little by placing a short spacer on the shock shaft under the shock piston. This also reduces shock stroke, however, and it may not be the best idea if you run off-road or crank off monster jumps. While it would be possible to swap out the arms and drive shafts for longer off-road buggy units from Tamiya's Blazing Star (call Tamiya at 1-800-TAMIYA-A for part numbers), I think the cost would be pretty steep.



## Heavy Thinking

My Associated RC10L pan car and my RC10T stadium truck both understeer with the power on. When I hit the throttle in the turns, they both "head for the pipes," but when I let off, the steering hooks up and I can get around the turns. On both vehicles, I can play with ride height and caster, and on the truck, I can mess around with the camber links and rear camber, too. By the way, my 10L has the "old-style" front end. Should I compensate for the push by loosening up on the rear end? What else do you sug-

gest? Has anyone ever tried mounting the steering servo ahead of the axle centerline on a pan car? It's easier to drive a car with understeer, but this ain't no fun!

DAVE COWGER

Seattle WA

The problems you describe are pretty typical of parking-lot racers, especially when they're run on a high-grip surface. You aren't far off the mark when you talk about "loosening" the rear end (less rear traction) to compensate for the steering; handling is always affected by front and rear traction. Too much front traction, and the car oversteers, spins out and is generally difficult to drive consistently. Too much rear traction, and the car won't steer under power. Of course, sometimes, you just have to slow down for the turns!

There are several ways to fix the problem, and it shouldn't cost too much to turn your vehicles into pavement tigers. Since the general rule of thumb is that "the lowest end steers the car," check ride height and see whether the rear end is lower than the front end. If it is, bring the front down (or raise the rear) until the front of the chassis is lower than or level with the rear. If that doesn't solve the problem, reduce caster up front a little at a time (remove caster wedges under the front arms on your 10L or use lower-degree caster blocks on your 10T) until you can take the turns more easily. If you try these tips and they don't work, then I suggest you use harder rear tires or softer front tires.

Trinity's Evolution 10 uses a "front-steer" servo, as does Trinity's Street Spec car. The original Hyperdrive pan cars also had the steering servo mounted ahead of the axle. Some people like the extra weight this puts on the front end, but your 10L has a big hole where the servo would have to go. Now, get out there and go fast!

## Pyro Pack

My Team Losi XXT 'CR' is equipped with Futaba radio gear, a Novak Tempest ESC, a Reedy Sonic2 11-turn motor and foam tires for carpet oval. When I race, my batteries get so warm that the shrink-wrap cracks and the ends of the battery packs melt! I geared down a little bit and used thicker wire to the motor, but it hasn't helped very much. Everyone I've asked is stumped. Can you help?

JEFF SVETE

Waukegan, IL

You're asking an awful lot of your battery packs. It's kind of like wrapping yourself in heavy plastic, securing it with duct tape, putting some sweats on top and going for a five-mile run ... in Miami ... in August. Get the picture? Those poor cells are all wrapped up, and you're asking them to pull a heavy truck at high speed for 4 minutes without any cooling air (they're under the truck body, right?). Whenever you start to see things melting and cracking, stop right away and figure out the cause of the problem.

You either have the wrong gearing (pinion too big or spur too small), or there's some sort of drag on the gearbox or shafts—maybe even a bad bearing. Take the pinion off the motor and spin the wheels. Do they roll for a while, or stop right away? If they don't spin for 10 to 20 seconds, you must figure out what's binding and then free things up. Check the tranny and universals for bent parts. How about electronic bottle-necks? Are your soldering skills pretty good, or are the wire joints and connections twisted and lumpy? You may have excessive resistance there, as well. As far as gearing goes, I would start with an 88-tooth spur and 18-tooth pinion, and move up or down from there. Finally, to cool things down, drill a few 1/4-inch holes in the base of the windshield to allow airflow through the body. Hope this helps!



## Brush Grindin' Lunch Box

I have a Trinity Quartz 19-turn double-wind motor in my Tamiya Lunch Box. One day, I noticed it was running slowly and making a grinding sound. When I got back home, I took the motor apart and found that both brushes had broken and were grinding in the armature. I installed another pair of Trinity brushes, and the same thing happened after about a week. I'm thinking about buying a new Phantom 12-turn armature for this motor, but I want to get this problem fixed first. What should I do?

JOSH ANDERSON  
Gaines, MI

You have the right motor for your Lunch Box, and as much as I love Phantom motors, I think the 12-turn armature would be major overkill for your short-wheelbase vehicle. Instead, I suggest a little regular motor maintenance. Modified motors require more maintenance than stock or closed-endbell motors, and if you don't take care of them, they'll grind themselves to death! You should remove the motor and clean it after at least every four or five runs. Remove the brush springs and brushes from the hoods, clean the comm with a comm stick (try Trinity's\* Comm Pen), and flush out the dirt and brush dust with a good-quality oil motor spray. Put a drop of light oil on each bearing, then reassemble and re-install the motor. As for your broken brush, the brushes might have worn down until they were so short that they caught in the commutator slots, or perhaps something got wedged in there. To make the brushes last longer, have the comm re-trued periodically (now would be a good time to start). If properly maintained, a good mod motor like your Quartz will last a long time. Good luck!



# Saving money, going faster, doing the job more easily

**W**hen I attend regional races and regular club nights, I make a point of talking to fellow racers who have discovered ways to make their R/C lives simpler, easier, or cheaper. When I discover a really primo tip, I write it down in a little book that I always carry in my pit bag. Back home, I test these tips in my secret underground laboratory, just to be sure that the information I give you is as accurate and as useful as it can be. Only after this testing has been completed (kind of like the "Betty Crocker kitchen" of R/C), do these ideas appear in this column.

Here is a selection of tips right out of the lab, all guaranteed to make your R/C life a little nicer. Enjoy!

## TIME TO FIX THE DONUTS

Every Thursday night, I race in a spec-class Formula 1 club. We run on foam tires in a very nice, carpeted facility that has hosted this series for more than three years. While I love the format and the racing is very competitive, I really dislike the way the foam tires chip and chunk on the carpet. It's not unusual to hear racers gripe about tire chunks that have mysteriously disappeared from the edges of their foams, and after every heat, it's normal to see one or more racers walking around the track trying to find the missing chunks. Once found, the chunks can be glued back into place with contact cement in time for the next race.

If the correct piece can't be found, the gap in the tire's edge (left by the missing foam) can wreak havoc with a car's handling. Since the best front tires for this particular carpet are exotic purple compounds that cost more than \$23 a pair,

*A chunk like this in your front tire can make your car handle inconsistently, but it can be fixed.*

*To prepare the tire for repair, square off the chunked area.*

*Cut a patch from an inexpensive donut and glue it in place with contact cement. It's OK if the patch is taller than the tread; a trip to the tire-truer will quickly correct that.*

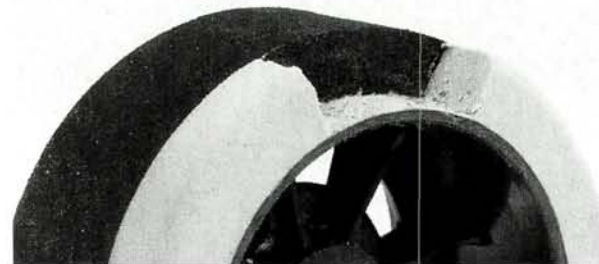
*After it has been trued, the tire is as good as new. A Street Spec tire is shown here because it's easier to see the process; when you repair black foam, the fix is practically invisible.*

the chunking is not only annoying, but it's expensive, too!

At one race, I was lamenting a missing chunk when fellow racer John Bergsmith (aka "Yellow Boy") suggested I replace it with a piece of less expensive foam. Using a new no. 11 blade in my hobby knife, I squared off the hole left by the missing piece and

removed the scraps from the edges, all the way down to the rim. I cut a piece of the correct size off a 1/12-scale, blue-compound donut and used it to fill the hole. I smeared a little contact cement on both the tire and the replacement chunk, and it slid right into the hole as if it belonged there. I

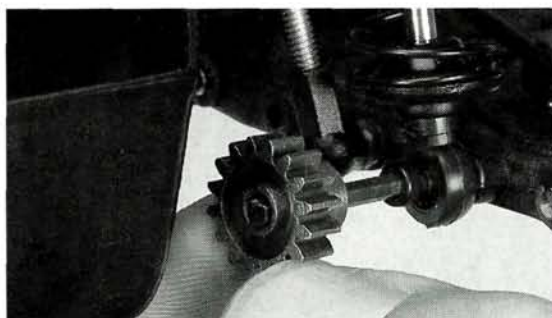
gave the glue an hour to set and then carefully trued the tire on my Max Mod Classic. The result was a tire that you really had to examine to locate the repair and one that performed every bit as well as the original. Me? I saved over 20 bucks; always good news!



## SHORTY HEX WRENCH

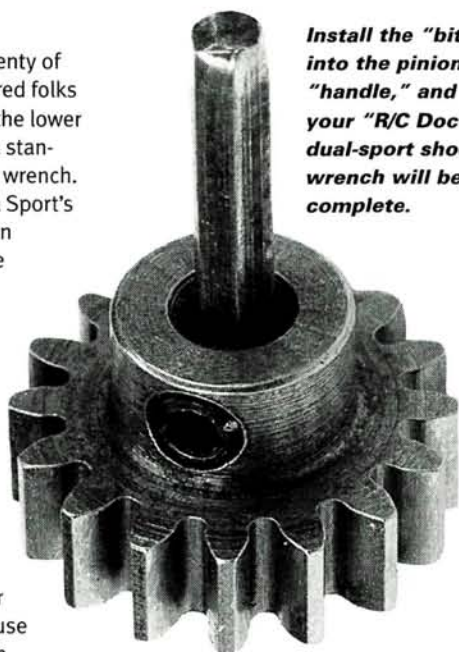
I really love my Associated\* Dual Sport. Fast, well-designed and incredibly durable, it reminds me of the old RC10 buggies we converted to street thrashers and dirt-oval cars more than a decade ago. Of course, that was long before sedans became popular, so we had to make do with wider suspension arms, bodies and drive shafts than we have today.

Unfortunately, one result of their narrow design is a shortage of space between some of the suspension components and the main chassis tub. For instance, on the older, wider



*See how tight the space is between the lower shock mount and the chassis tub? The homemade wrench is the perfect tool for these tight corners. You'll probably find it handy for use on other cars, as well.*

cars, there was plenty of room for fat-fingered folks like me to mount the lower shock bolt using a standard T-handle hex wrench. However, the Dual Sport's shorter suspension arms make it more difficult to access the lower shock-absorber screw, and it's even worse when the shocks are shortened to reduce ride height. To remove or install the lower mount, you must use the short end of an



**Install the "bit" into the pinion "handle," and your "R/C Doctor" dual-sport shock wrench will be complete.**

L-shaped wrench, rotated  $\frac{1}{4}$  turn at a time. Since I'm a big believer in tuning shocks whenever I change springs, fluids, or pistons, this presents a real problem for me. I was also concerned about all the Dual Sport owners who wouldn't bother to work

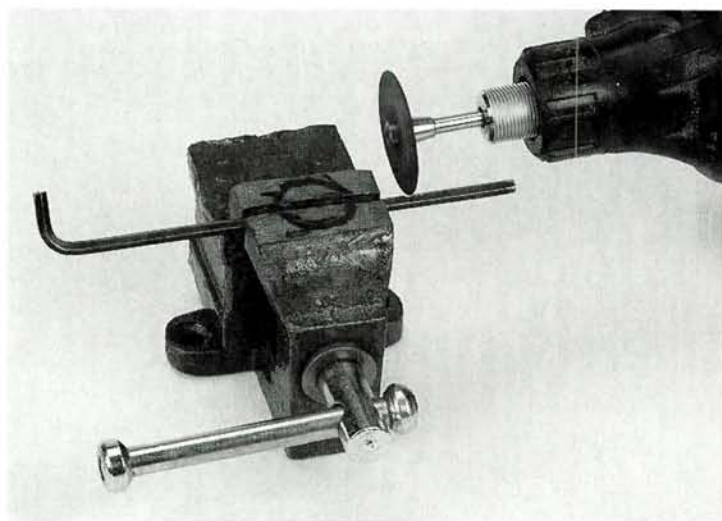
on their shocks at all because it's such a pain.

So, late one night in the lab, I came up with the "Shorty" hex wrench. I took an old, 32-pitch pinion gear (gee, when was the last time I used one of those?) and enlarged the motor-shaft hole by

drilling it out. Then I cut an inch off an old, L-shaped wrench that fit the socket of the 4-40 bolt that was screwed into the rear suspension arm. I slid the shortened hex into the enlarged pinion hole, tightened the setscrew and voilà! I have a short

wrench that fits easily into the space between the chassis tub and the lower bolt. The pinion teeth help to keep a good grip on the wrench when I rotate it to insert or remove the bolt, and the pinion gear's diameter is so small that it's unlikely to give you

enough leverage to strip out the hole in the suspension arm. With my new tool, I can remove the rear shocks, change springs, pistons, or fluid, and have everything back together in about a quarter of the time it used to take. That's easy!



**A rotary tool will make short work of an Allen wrench; just be certain to wear eye protection.**

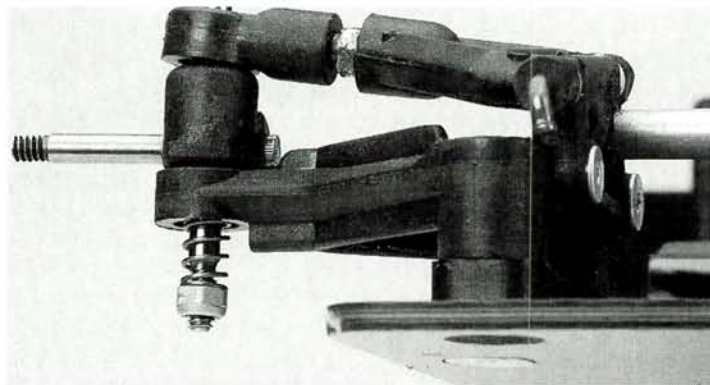
## BUILDING A BETTER KINGPIN

Pan cars are remarkably simple in design, yet they offer a lot of tuning options that will get them hooked up on almost any surface. When you tune a pan car, you can opt to change the front suspension spring. Install a harder front spring and you can limit skittish behavior on slippery asphalt parking lots; with a softer spring, you'll increase suspension travel and steering response and limit understeer without switching tire compounds.

Unfortunately, to change the springs, you generally have to remove an E-clip at the base of the kingpin. Although springs from several manufacturers may fit over the kingpin, they vary in length. That means you'll have to install them, put the wheels back on and then check the spring height, all to determine whether you need to pull the front end apart again to install a few thin shims. What a pain!

Dave Irrgang of Irrgang Racing Service\* (IRS) had a better idea. One of the most innovative designers of high-quality aftermarket parts for pan-car competition, Dave came up with a threaded kingpin that fits right into Trinity, Associated and HPI front ends and eliminates the need for E-clips at both ends of the stock parts. His kingpin slides down through the upper arm and steering spindle and out through the bottom suspension arm. Place the spring you want on the lower end and thread one of the 4-40 locknuts onto the kingpin until you have the desired preload. Presto! Your springs are change-o'd! These polished kingpins are available in  $\frac{1}{10}$  and  $\frac{1}{12}$  scale. Use the  $\frac{1}{12}$  scale to replace the kingpins on your HPI F1 car, and you'll never lose another spacer.

While he was at it, Dave turned his attention to the  $\frac{8}{32}$  diff nut found on almost all pan-car axles. Nylon nuts eventually spread and loosen, and this makes it difficult to maintain diff tension during an entire race. Aluminum nuts with a Nyloc insert do a nice job, but there



**Tired of popping E-clips and juggling shims every time you need to tune your pan car's front end? This threaded kingpin allows for fast and easy spring swapping and preload adjusting.**

isn't enough locking material in the nut to hold up to frequent adjustment; before long, these nuts also loosen. IRS's answer was to develop nuts that don't have pre-cut threads. Although first-time installation of one of these nuts is difficult (your axle has to cut the threads), it ends up as the tightest, most precise diff nut your axle has ever seen. Easy!

Do you have an idea that saves money or time, or makes you faster? Would you like to share it with other *R/C Car Action* readers? Send it to "R/C Doctor," c/o *R/C Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606, and you might just find yourself credited with a terrific idea!

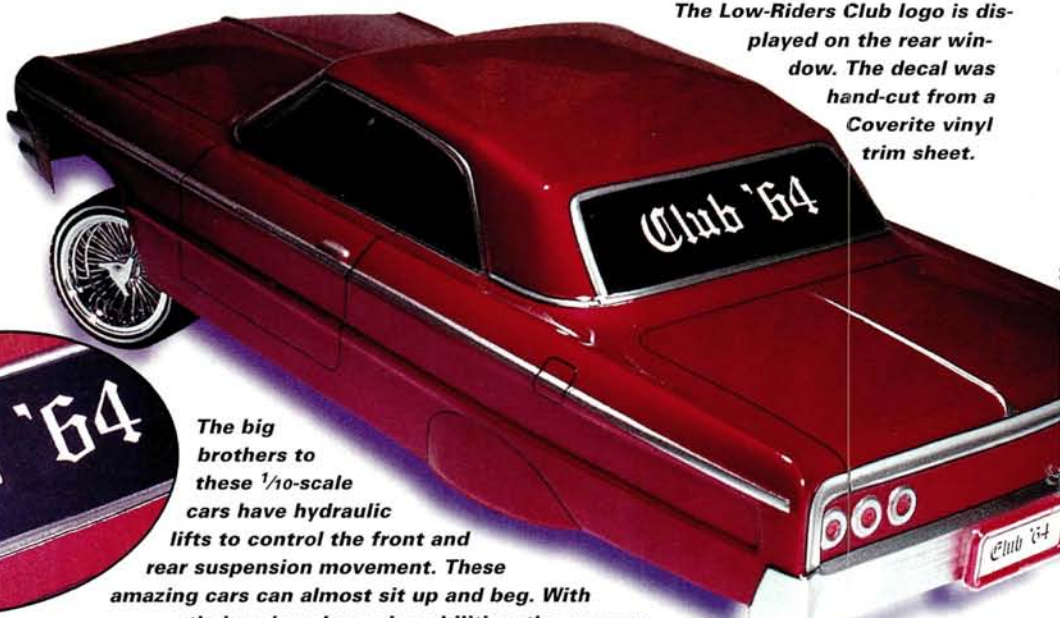
*\*Addresses are listed alphabetically in the Index of Manufacturers on page 217.*

## The Making of a Low Rider

**W**ith all the excitement about parking-lot touring cars, I almost forgot my first true love: the classics! In the '50s, sheet-metal masters such as George Barris, Ed "Big Daddy" Roth and Dean Moon created wild, sculpted custom cars that were dropped, chopped and channeled.



The Low-Riders Club logo is displayed on the rear window. The decal was hand-cut from a Coverite vinyl trim sheet.



The big brothers to these 1/10-scale cars have hydraulic lifts to control the front and rear suspension movement. These amazing cars can almost sit up and beg. With their unique bouncing abilities, the cars are entered in "hopping" contests to see which can bounce or hop higher. Pegasus Hobbies' '64 Chevy body was a shoo-in for my low-rider project.

Chrome is the story of the '60s. The familiar '64 grillwork is faithfully reproduced on this popular streeter. Meticulous work on the grill pays off with a great-looking facial; use thin stripes of black and silver cut from MonoKote\* or Coverite\* vinyl trim sheets for a crisp look. Autographics\* makes a real, true-to-scale personalized license-plate kit (no. 10851). Note the headlight shields. Dahm's Instant Tint (no. D816) was used to color the headlight lenses red.



The popular fashion was to "drop" or lower your car using lowering blocks and remove all the chrome—even the door handles—to make the body sleeker and more aerodynamic. In the '70s, the style was to install air shocks to jack up the rear end. Then, wide tires and rims were bolted on in back to make it look like a dragster.

Today, the fashion is for skinny tires and "slamming" (lowering) your vehicle to the ground as far as is possible. Although hydraulics weren't available 40 years ago to raise and

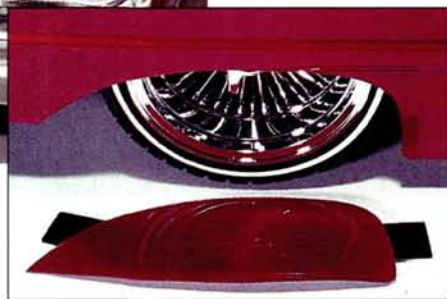
lower the chassis, it seems as if history is repeating itself! My project this month is to create the ultimate low-rider street machine.

The heart and soul of this project are the '64 Chevy Impala (no. 4000) body and the sophisticated-looking chrome rims (no. 3001) and knockoffs (no. 3003) from Pegasus Hobbies\*. Among legions of low riders, this highly detailed '64 Impala is the most commonly used

body style. Its outstandingly detailed trim and front grill really set its body apart from those of other classic cars. The rear wheel-well fender skirts were also thoughtfully molded into the shell.

Most of my reference material for the bodywork was taken from various "low-rider" magazines. These mags have loads of nice-looking bodies and are a useful resource.

Remember fender skirts? They added a smooth, clean look by covering up the rear wheel wells. Cut out the fender skirt and use Velcro®-brand fastener strips or servo tape for reinstallation. Now they're removable, so you can get a better look at those awesome-looking California wire rims and knockoffs. These are also available from Pegasus Hobbies in gold (no. 3002) with knockoffs (no. 3004), and they'll fit your touring car, too!



After I prepped the Lexan for paint, I used Dahm's\* Pro-Mask (no. D821) to make ultra-clean paint lines on the window and body trim. Next, I sprayed on four coats of Pactra's Metallic Red (no. RC264) and followed it with three coats of Indy Silver (no. RC262) to make the flakes pop right out at you.

For a true custom touch, I added a neat detail piece from R/C Neon\*; the Neon License

Plate kit (no. RCN204) was just what I needed for my low-rider motif. Take special care when using this Neon kit; read the directions carefully, because this is some high-voltage stuff! (Don't worry, though; it's completely safe.) The kit is easy to install, and the company also manufactures other cool neon devices with a variety of uses; I can only imagine what some of you out there in readerland will use them for!

## CONCOURS CORNER

I'm a real fanatic about Chevs, so I really enjoy working on this car. I love the low-rider persona; your car looks great, and you can drive as sloooooow as you like.

Killer detail work and high-quality products were a great help in

completing my low-rider project; thanks for coming along for the ride. I hope I ignited a creative spark in you to fire up your next R/C endeavor. Until next time, keep those R/C dreams—nostalgic or otherwise—alive.

**The rear end of this classy bomb carries hot-looking neon license-plate frames (no. RCN204—red, or no. RCN200—aqua). Dry-transfer press-on lettering works well to personalize the illuminated plates. Look for press-on letters at a drafting supply store or craft shop.**



## cool new products

I've seen plenty of good-looking paint jobs created with spray paint, but it takes a quality airbrush to get really professional results. And for most advanced painting techniques, an airbrush is an absolute must.

Aztek\* airbrushes are just about the best going. The A430 model pictured here is Aztek's double-

action unit (with user-controlled air and paint-flow) that comes complete with three nozzles (general purpose, general detail and high flow) to eliminate the need for those difficult-to-adjust needles. Two color cups are also included; the larger one will fit directly onto Pactra paint bottles; handy. The neat case is standard, too. Look for an in-depth airbrush "basics and how-to" article soon.

**Want to create paint jobs like the one on this beautiful Nissan Primera from Protoform\*? Learn to use an airbrush. (If you want to see a bunch of other hot touring-car bodies, be certain to pick up the 1998 edition of Radio Control Touring Cars; we stole this photo from the "Body Guide"!)**



\*Addresses are listed alphabetically in the Index of Manufacturers on page 217. ■

**Roland**

graphic jam.



If you want to add traffic-stopping graphics to your RC cars, check out the STIKA design cutter from Roland. It's small enough to sit on your desktop and powerful enough to create detailed logos, vinyl lettering, custom airbrush stencils, and more. Available in 8" and 12" wide models, STIKA connects to your PC or Macintosh\* and provides everything you need to create high-impact graphics, including a lettering and graphics program. Vinyl is available in a wide assortment of colors. Call toll-free or visit our Web site for more information.

\* With optional SignMate STIKA Software

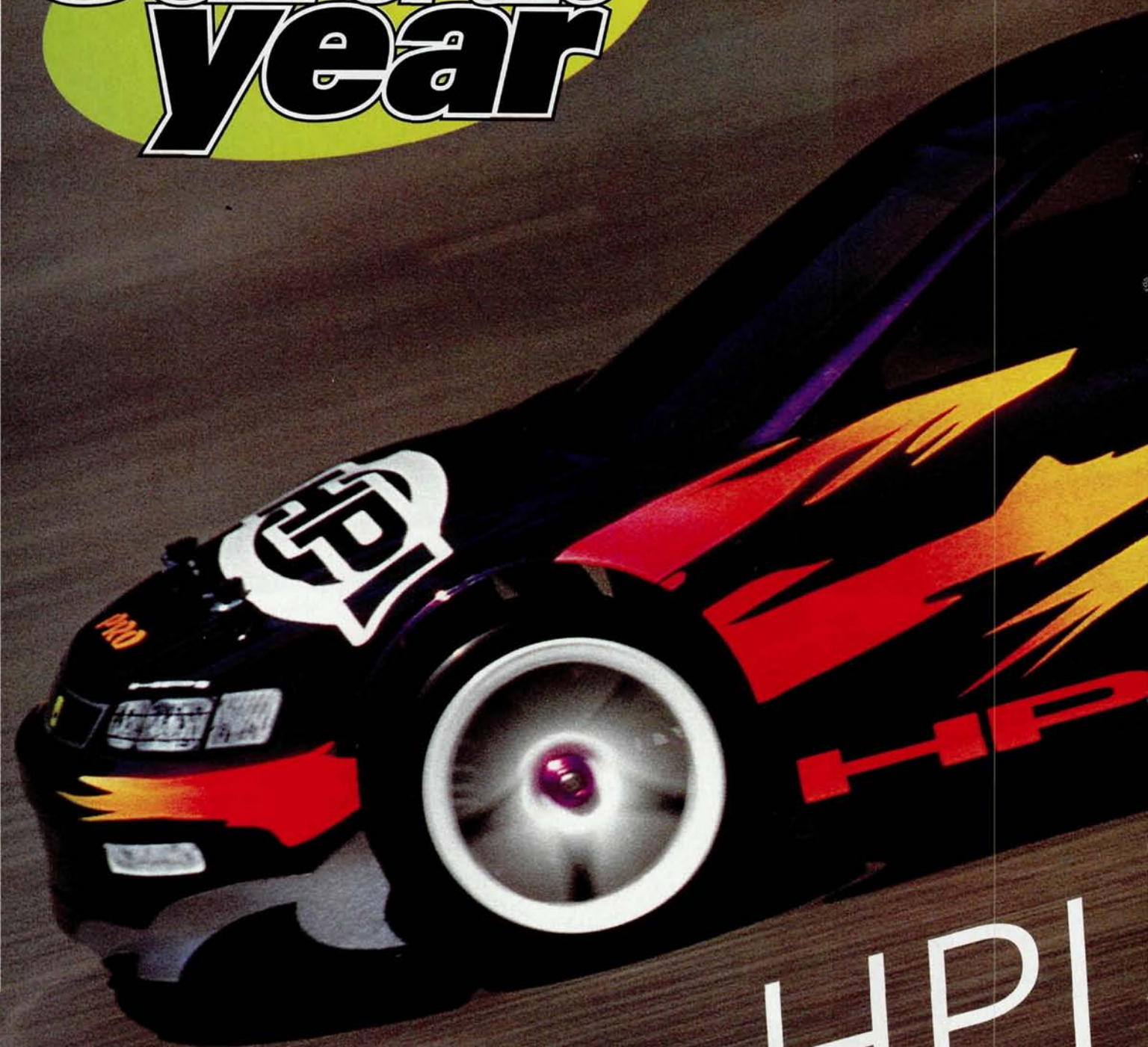
Cars designed by:  
Kent Clausen HPI  
Mike Ogle Team Associated

**STIKA Design Cutters. Custom graphics in a flash.**

Roland DGA Corporation, 15271 Barranca Parkway, Irvine California 92618-2201, (800) 542-2307, (714) 727-2100, fax (714) 727-2112, [www.teamstika.com](http://www.teamstika.com)

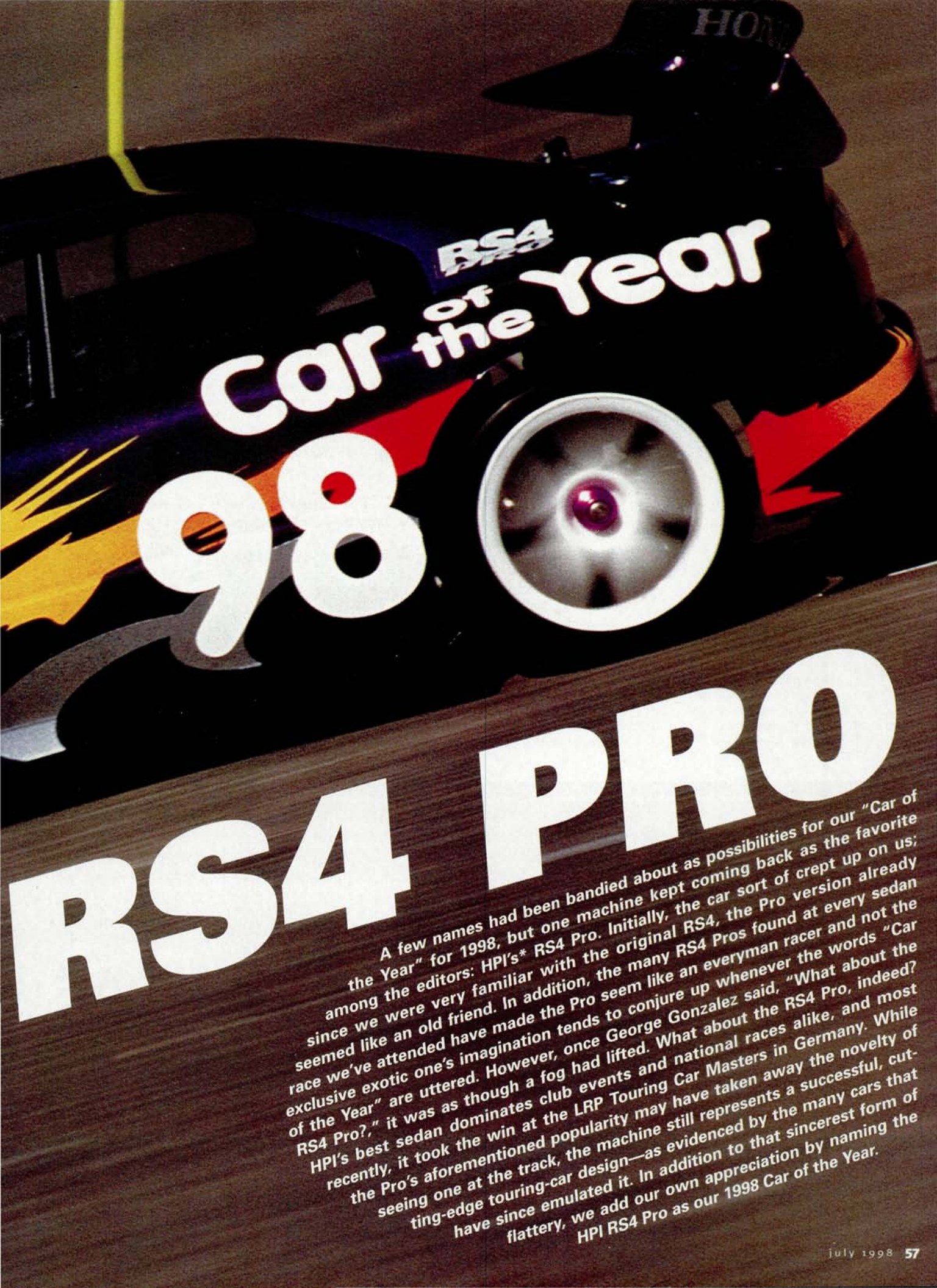


Radio Control  
**CAR ACTION**  
**car of the year** 1998



by the staff of  
RADIO CONTROL CAR ACTION

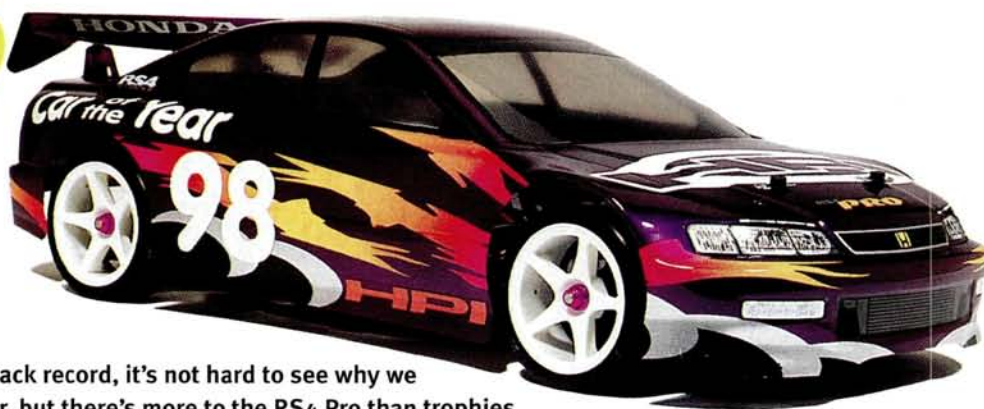
HPI



# Car of the Year 98

# RS4 PRO

A few names had been bandied about as possibilities for our "Car of the Year" for 1998, but one machine kept coming back as the favorite among the editors: HPI's\* RS4 Pro. Initially, the car sort of crept up on us; since we were very familiar with the original RS4, the Pro version already seemed like an old friend. In addition, the many RS4 Pros found at every sedan race we've attended have made the Pro seem like an everyman racer and not the exclusive exotic one's imagination tends to conjure up whenever the words "Car of the Year" are uttered. However, once George Gonzalez said, "What about the RS4 Pro?," it was as though a fog had lifted. What about the RS4 Pro, indeed? HPI's best sedan dominates club events and national races in Germany. While recently, it took the win at the LRP Touring Car Masters in Germany. While the Pro's aforementioned popularity may have taken away the novelty of seeing one at the track, the machine still represents a successful, cutting-edge touring-car design—as evidenced by the many cars that have since emulated it. In addition to that sincerest form of flattery, we add our own appreciation by naming the HPI RS4 Pro as our 1998 Car of the Year.



## WHY IT WON:

Given the Pro's popularity and track record, it's not hard to see why we would name it our Car of the Year, but there's more to the RS4 Pro than trophies and impressive sales. Here's what makes it a favorite of racers and enthusiasts alike:

### s p e c s

SCALE 1/10  
LIST PRICE \$399

**DIMENSIONS**  
Length overall 6.875 in.  
Wheelbase 10 in.  
Width(F/R) 7.25/7.125 in.

**CHASSIS**  
Type Upper and lower plate  
Material Carbon fiber

**DRIVE TRAIN**  
Type Belt  
Primary Pinion/spur  
Transmission Universals  
Differential(s) Ball  
Bearings/bushings Shielded ball bearings

**SUSPENSION (F/R)**  
Type Lower suspension arm w/turnbuckle upper link  
Damping Oil-filled, coil-over shocks

### VERSATILITY

- The RS4 Pro accepts any touring-car wheel with 12mm hex hubs (and that's 99 percent of the wheels out there).
- Any spur gear with the industry-standard "two-hole" mounting pattern will fit the layshaft.
- Don't like saddle packs? Bolt in the included quick-release battery holder, and stick packs drop right into the chassis.
- The Pro's body posts will match up with most Tamiya shells, and most body manufacturers dimple their bodies for this pattern. That means most bodies are a drop-on fit for the Pro. Nice.

### ADJUSTABILITY

- Without hacking up the hubs or suspension arms, the RS4 Pro can be assembled as a narrow car (the stock setup), or you can add longer universals and move the hubs outboard for a "wide" setup.
- The shocks include a variety of preload spacers in various thicknesses, and five pistons are available for damping adjustments.
- The shock towers and suspension arms offer plenty of shock-mounting options for subtle handling adjustments.
- All camber links and tie-rods are convenient turnbuckles.

### DURABILITY

We pounded on two RS4 Pros in a four-hour endurance race on carpet (details in an upcoming issue). After four hours of hard racing (as in hard, wooden boards and hard concrete under carpet), the cars had some hideously disfigured bodies, but had broken nothing. Add this to the countless tough-car anecdotes we hear, and you have one bomb-proof race car. And, hey; if you do break something, parts are cheap and easy to get.

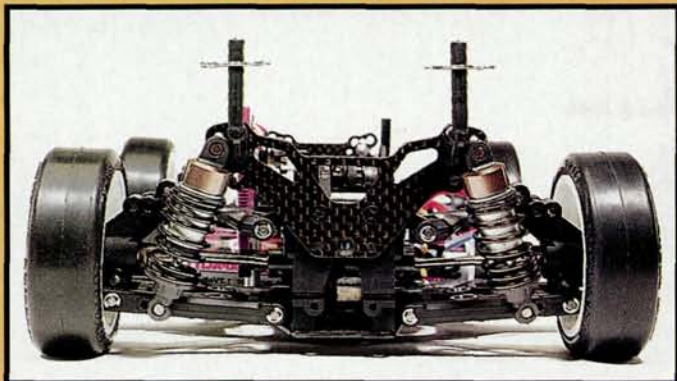
## Meet the family

As you've probably noticed, the RS4 Pro isn't the only RS4 in the HPI stable; clockwise from top left, we have the Nitro RS4, Mini RS4, Nitro Mini RS4, RS4 Sport and RS4 MT. The Pro is the

most lavishly equipped RS4, but the quality and durability are the same for all the cars, from Mini to MT. Pick your taste, terrain and budget, and there's an RS4 to meet it.

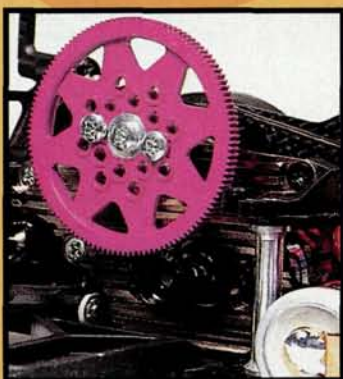


# INSIDE THE RS4 PRO



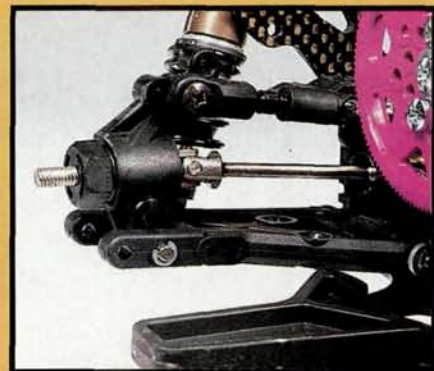
There's plenty of room under the rear diff for debris to escape. Universal drive shafts are standard equipment on all four corners.

The **front diff-belt pulley** rides on a one-way bearing for increased on-power steering and the ultimate in straight-line efficiency.

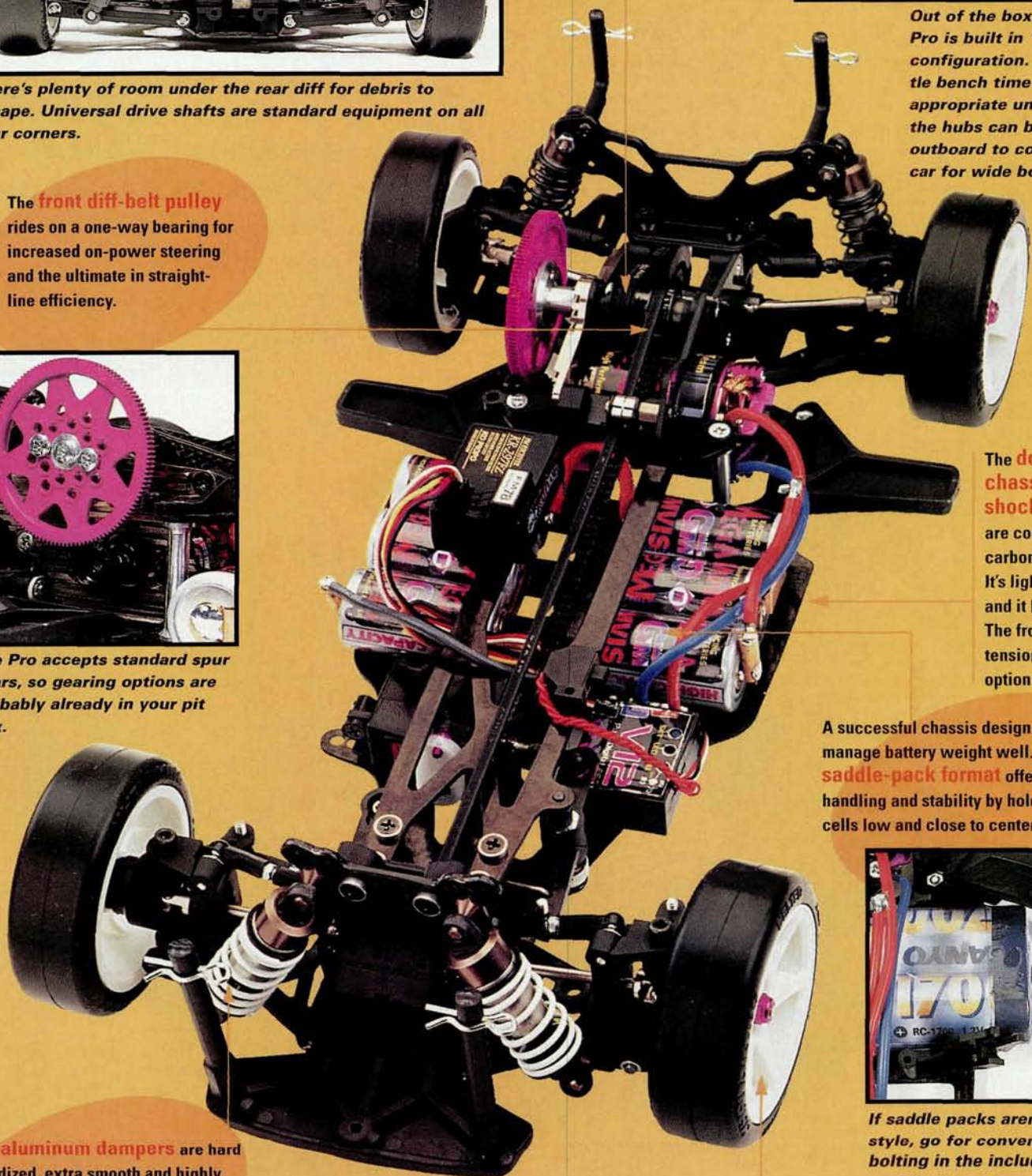


The Pro accepts standard spur gears, so gearing options are probably already in your pit box.

The Pro isn't the first car to use front and rear belts, but HPI's unique **eccentric cam-tension adjustment** for the rear belt is a stroke of genius.

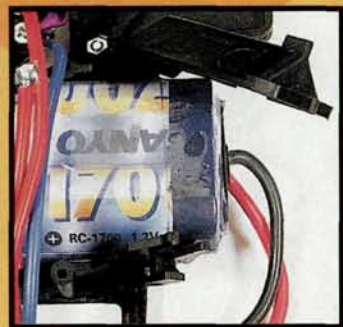


Out of the box, the RS4 Pro is built in "narrow" configuration. With a little bench time and the appropriate universals, the hubs can be moved outboard to convert the car for wide bodies.



The **double-deck chassis and shock towers** are constructed of carbon-fiber plate. It's light, it's stiff and it looks cool. The front belt tensioner is an option part.

A successful chassis design must manage battery weight well. The Pro's **saddle-pack format** offers superior handling and stability by holding the cells low and close to center.



If saddle packs aren't your style, go for convenience by bolting in the included stick-pack battery tray.

HPI **aluminum dampers** are hard anodized, extra smooth and highly tunable. Plenty of preload spacers and shock pistons are included.

The RS4 Pro is shod with **belted, super-narrow slicks** as stock equipment. Since the original RS4, HPI has used the common 12mm hex-hub for its wheels, ensuring that the RS4 Pro will accept virtually any touring-car hoops.

\*Addresses are listed alphabetically in the Index of Manufacturers on page 217.

# Higher TECH

The Touring Car for Tuners.

At TECH Racing, our tuners built their reputations on innovative, high performance aftermarket mods for F.1, FWD, 4WD and Mini class competition.

Now they've created the 4WD Touring Car for tuners, the Voggerd T-10. The T-10 is a built around a bulletproof 3-belt, alloy bulkhead 4WD

system. Ball joint suspension and sophisticated, sleeved, multi-chambered progressive damping shocks are also part of the handling package.

In fact, *RC Car Action* called the T-10 "the most adjustable car ever built."

The Voggerd T-10 and Tech Racing options, the highest tech for RC competition.

## Tech Voggerd T-10 Features

**3-belt, high efficiency full-time 4WD**

**Duralumin front/rear bulkheads**

**Duralumin shock towers/supports**

**High efficiency 64 pitch gears**

**Lightweight front/rear ball diffs**

**FRP chassis (Main-2.3/Center-1.5)**

**Triple upper deck design**

**Adjustable camber and toe-in**

**Adjustable caster and skid angle**

**Sleeved, pressurized oil shocks**

(Body, electronics, motor, NiCd battery and socket wrench not included.)

Scale: 1:10  
Wheelbase: 260.0mm  
Weight: 54oz  
Width: 187mm  
Options: Carbon fiber decks  
Carbon shock towers

The Voggerd T-10. Built by tuners to be raced by tuners. Ball joint pivot joint suspension arms allow caster adjustment. Ride height and skid angle adjustable with shims.

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**TEST**

1/8 scale gas



# Kyosho **Inferno DX-II**

by Derek Buono



**W**ANT TO GO nitro racing with a Kyosho MP-5, but don't have the Benjamins to shell out? Kyosho\* has what I consider to be the ultimate solution to your problem: the Inferno DX-II Limited, which was designed to appeal to drivers who want to break into the exciting world of 1/8-scale-nitro off-road racing but don't want to break the bank.

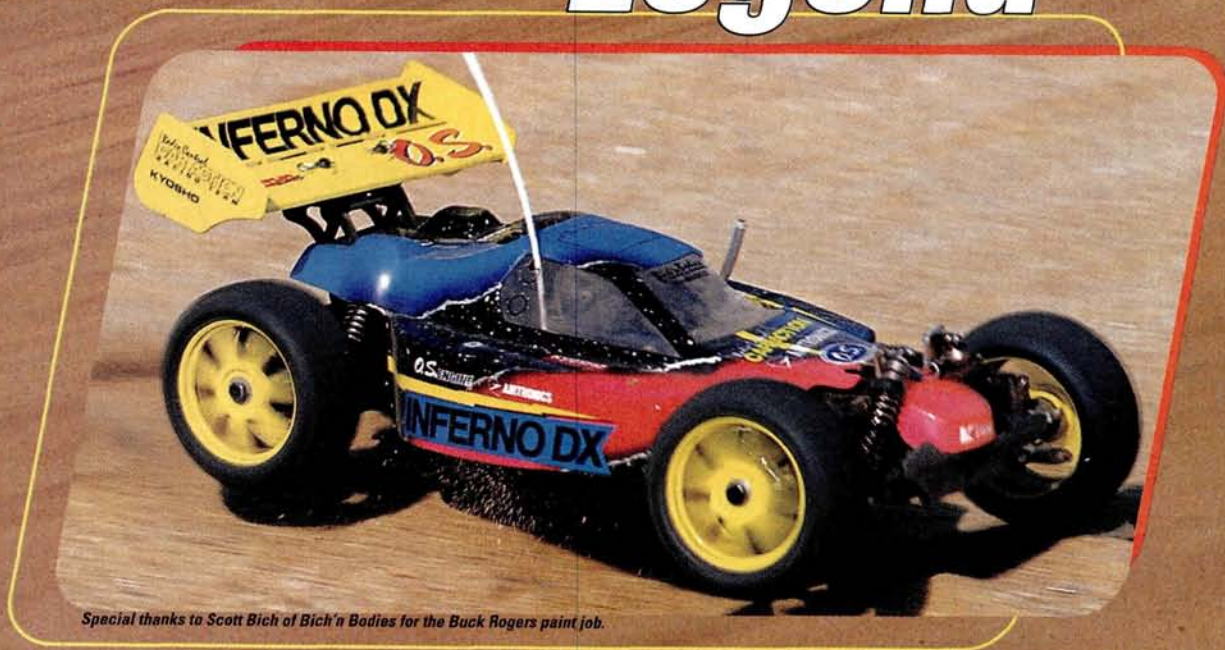
To ease the transition into the world of nitro, budget-conscious Kyosho has introduced its most

affordable 1/8-scale off-road nitro car to date. And it isn't only affordable; it also comes out of the box partially assembled, so you can concentrate on important things like racing!

The DX-II has some of the best predecessors in R/C racing to call on for its design, and it takes advantage of components that have been thoroughly tested through years of racing with the Burns, Turbo Burns, Inferno and the MP-5. It has all the stuff to get jiggy, but can it? Read on to find out ....



# Entry-level Legend



Special thanks to Scott Bich of Bich'n Bodies for the Buck Rogers paint job.



## specs

**SCALE** 1/8  
**LIST PRICE** \$449.99

**DIMENSIONS**  
**Length overall** 18.90 in.  
**Wheelbase** 12.91 in.  
**Width (F/R)** 12.01 in.

**WEIGHT**  
**Gross (RTR)** 6 lb., 8 oz.

**CHASSIS**  
**Type** Stamped plate  
**Material** Aluminum

**DRIVE TRAIN**  
**Type** Shaft-driven 4WD  
**Primary** Clutch bell/spur gear  
**Transmission** Front/rear dogbones  
**Differential(s)** 3 bevel-gear diffs  
**Bearings/bushings** Ball bearings

**SUSPENSION (F/R)**  
**Type** 4w independent w/lower A-arms and upper adjustable links  
**Damping** Aluminum, oil filled, coil-over shocks

**WHEELS (F/R)**  
**Type** One piece plastic  
**Dimensions (DxW, F/R)** 4.53x1.69 in.

**TIRES**  
**Front/rear** Spike

**POWERPLANT**  
**Engine** O.S. .21 RG  
**Carb** Slide  
**Pipe** Kyosho tuned exhaust

## THE KIT

Kyosho decided to market the DX-II partially assembled, so building time is considerably reduced. The front and rear differentials are assembled and mounted on the aluminum-plate chassis, and the center diff and braking system are also assembled.

• **Chassis.** The Inferno DX-II has a flat-plate chassis and 4W independent suspension. The chassis plate's design harkens back to the days of the Turbo Burns and the original Inferno—both very successful. At all four corners, the suspension is double A-arm with Kyosho's excellent oil-filled shock absorbers. The engine is mounted in line with the drive shafts and includes front, center and rear bevel-gear diffs.

• **Shocks.** The shocks are the only tricky parts left for you to assemble. If you follow the instructions properly and exercise a little patience, you'll have what are considered to be some of the best shocks in the business. Though they're usually reserved for more expensive racing machines, a full set of ball bearings is included in the DX-II kit. A set of slick wheels and all-purpose spikes round out the goodies.

• **Suspension.** Straight from the original Inferno, the DX-II's suspension arms are molded, black composite with adjustable tie rods to alter camber and toe-in. Each lower suspension arm has a setscrew to limit down-travel; it is quicker and easier to turn this screw than to limit down-travel on the shocks themselves.

The length of the upper A-arms can be adjusted to allow changes in camber angle. Each wheel is driven by a beefy metal drive axle and is supported by sealed ball bearings.

• **Power.** The performance and reliability of O.S. engines have always been excellent, so I decided to equip the DX-II with an



A tuned pipe is included with the DX. Note the funky, rear-mounted stinger.

O.S.\* Max .21RG. It's much less expensive than O.S. Engines' premier buggy-racing powerplant, the mighty RZ-B; though the RZ-B has an advantage in horsepower, the RG wins in the bangs-for-the-buck department. The RG's two-needle carb (idle and high-speed fuel mixture) is far superior to other economy carbs that don't allow idle-mixture adjustment.

The DX-II kit comes with a manifold and a tuned exhaust pipe—both expensive parts that, with most other 1/8-scale cars, have to be bought separately. Kyosho has included this excellent exhaust system while maintaining an attractive price tag.

• **Radio gear.** A removable aluminum radio tray makes cleaning and maintenance a snap; all the radio gear can be taken out in seconds. I used Airtronics\* new M8 radio system. Let me tell you, this is one sweet radio—clean, comfortable and pretty.

## BUILDING & SETUP TIPS

■ I don't want to nag, but there's a thread-locking compound called "Loctite\*," and gas cars are ideal candidates for it. This stuff helps prevent screws and other important fasteners from working loose as the engine vibrates. Loose parts equal a headache; should I continue? I think you get my point.

■ Pay special attention to the screws and their sizes. I had some left over that didn't seem to belong. Don't be like me and use the wrong ones, or you'll have to go back and spend time fixing your mistakes.

■ Don't forget (as I did) to put the two screws in the rear bulkhead to secure it to the chassis.

■ If you haven't had your eyes checked recently, use RPM's\* camber gauge to ensure the same camber setting on all four corners.

■ With any nitro engine, break-in is one of the most important procedures. Carefully follow the instructions included with your engine, and when in doubt, seek help.

## YOU'LL NEED

- 2-channel radio with two servos.
- Receiver pack.
- .21-size engine.
- Fuel and bottle.
- Glow-starter.
- Starter box (if using non-pull-start).

## FACTORY OPTIONS

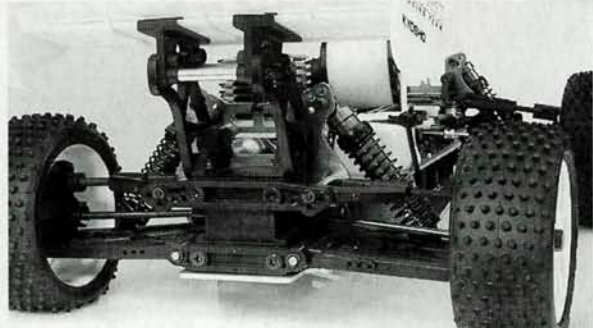
- Special disk brake—part no. BSW52
- Steel main gear—IFW03
- Manifold—39516
- Custom muffler—BSW48
- Colored wing—BSW71
- Turbo wheel—BSW80
- Microblock tire—W5647S
- Soft springs (F/R)—BSW65/BSW76

Airtronics 97737 and 97102 servos were installed to give lightning reflexes and brute torque to the steering and the throttle. Dynamite's\* 5-cell receiver pack supplied the juice to get things moving, and Kyosho's vinyl cover protected the tiny receiver from the elements.

## PERFORMANCE

I broke in the engine and tested the car at JP's Hobby Center and Raceway in Derby, CT.

Along for some fun was fellow contributor and friend Kevin "hingeboy" Hetmanski with his tricked-out Mugen Super Athlete. Having another vehicle on the track for competition keep things ... er ... "interesting." My completely



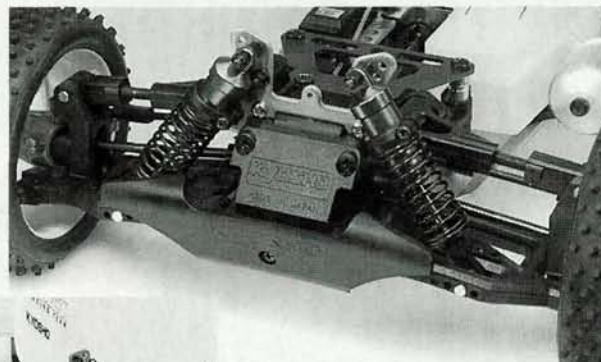
stock DX II handled the bumps and tight turns with ease and allowed me to finesse my way around the track.

An 1/8-scale "great" told me this trick: run a 4WD with lots of rear brake, and you'll be able to pitch the rear around as you would the rear of a 2WD car. For me, this works extremely well, and I recommend that you experiment with this setup.

After running through about five tanks, I was comfortable with the DX-II's handling and was ready to open the off-road season at R/C Madness in Enfield, CT—a much larger track on which I was eager to see how this competitor would do against some topnotch competition.

Opening day drew close to 20 entrants in the 1/8-scale class. I was up against some seriously tricked-out Mugen Athletes and Kyosho MP-5s, but I had confidence in my driving skills and the DX-II's capabilities.

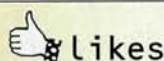
After the first qualifying round, I was



**Kyosho's heavy-duty, aluminum-body shocks perform well and would be at home on a kit of any price. Note the upper A-arms with large-diameter tie rods. The kit tires are good for most surfaces, but hard tracks might require a finer "fuzzy" knob pattern.**

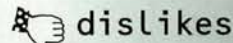
TQ and the car was running perfectly. The second round didn't go as smoothly: I lost a front-suspension-arm kingpin, so the DX-II was sidelined for the last round. But even with this fluke mishap, the DX-II's first qualifying effort held up against all the high-dollar buggies, and I qualified second to an MP-5 that was only 2 seconds ahead.

At the start of the 15-minute A-main, the DX-II launched into a lead that I stretched to about a lap before my first pit for fuel. Unfortunately, I had not confirmed with my pit crew that I would



- Proven design at a reasonable price.
- Tank-like durability.
- Extremely competitive, even against dream machines!

- The plastic brake disks wear quickly; Kyosho's fiber brake disks are a wise upgrade.





## Mugen Prime 12

by Derek Buono

*Mugen Seiki\* is known for high performance in the 1/8-scale arena, both off- and on-road. Armed with considerable experience, the Mugen team has created a new 1/10-scale nitro sedan—the Prime 12. This category is becoming hotly contested, but if this new machine is anything like its big cousins, Mugen Seiki should have a winner. Let's see what the Prime 12 is made of ....*

PHOTOS BY WALTER SIDAS

# Ballistic and beltless

## s p e c s

SCALE 1/10  
LIST PRICE \$355.99

**DIMENSIONS**  
Length overall 15 in.  
Wheelbase 10.16 in.  
Width (F/R) 7.8 in.

**WEIGHT**  
Gross, RTR 3 lb., 10.5 oz.

**CHASSIS**  
Type Lower plate/upper deck  
Material Aluminum/composite

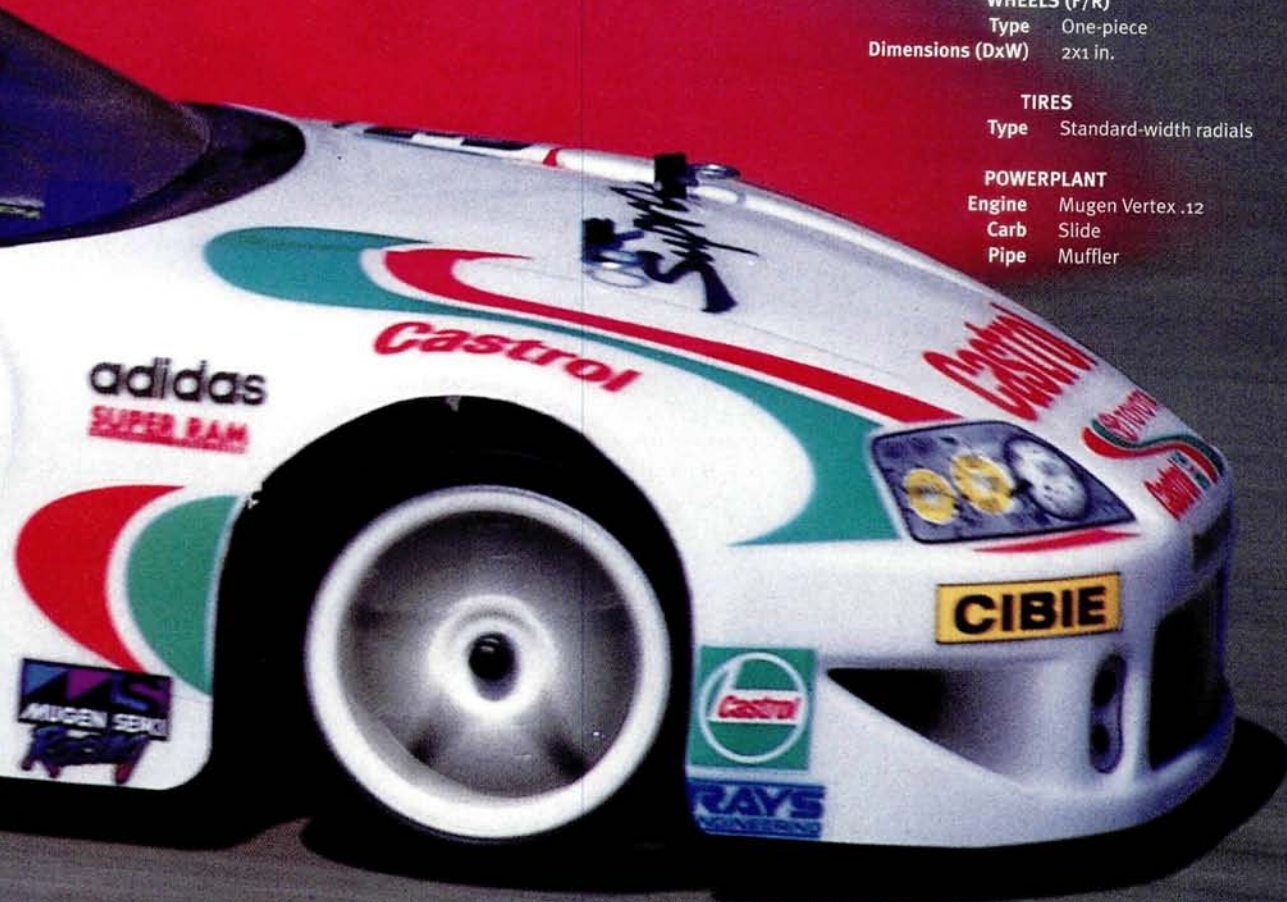
**DRIVE TRAIN**  
Type Shaft driven  
Primary Clutch bell/spur  
Transmission Dogbones/axles  
Differential(s) Bevel gear  
Slipper clutch None  
Bearings/bushings Metal bushings

**SUSPENSION (F/R)**  
Type Lower arm w/adjustable  
upper link  
Damping Plastic body, oil filled

**WHEELS (F/R)**  
Type One-piece  
Dimensions (DxW) 2x1 in.

**TIRES**  
Type Standard-width radials

**POWERPLANT**  
Engine Mugen Vertex .12  
Carb Slide  
Pipe Muffler





## BUILDING & SETUP TIPS

The car comes 90 percent assembled, so there's little building left to do. You should, however, look over a few points beforehand to ensure a pleasurable trip to the parking lot.

- Make a habit of checking screws for tightness, and apply Loctite\* to vibration-prone areas. The engine-mounting screws are prime candidates.

- Although it's well away from the fuel tank, it's always a good idea to seal the receiver in a balloon to protect it from spills.

- The servo-saver is difficult to adjust with the chassis' top plate installed. Check the adjustment at the bench and, if necessary, adjust it before you hit the track.

- At first glance, I thought the engine's slide-valve carburetor was missing a low-end needle; this is not uncommon with entry-level kits. But low end can be adjusted: turn the small screw on the slide itself. This needle was factory set for proper break-in, and I found no reason to mess with it.

## YOU'LL NEED

- 2-channel radio with two servos.
- Receiver pack.
- Nitro fuel.
- Glow starter.
- Polycarbonate-compatible paint.

## KIT FEATURES

- **Chassis.** The Prime 12 arrives 90 percent assembled and incorporates a stamped-aluminum chassis with slightly radiused sides to help stiffen the plate. A composite radio tray also bolsters rigidity and provides ample space for the electronic gear.

The steering is controlled by the usual bellcrank setup with a built-in, adjustable servo-saver. The bellcranks ride on bronze bushings—a step up from the plastic units often used (still not as nice as ball bearings, though). Two sets of adjustable body mounts are included to accommodate most body styles, and all-purpose radials on attractive, 5-spoke rims complete the rolling stock.

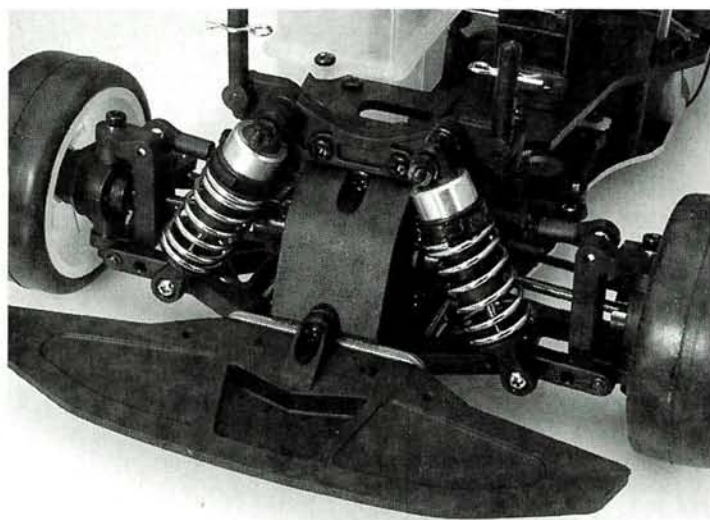
- **Drive train.** To provide full-time 4WD, Mugen Seiki has opted to use a shaft drive coupled with bevel-gear differentials. The front and rear gearboxes are linked to the centrally mounted spur gear via overgrown dogbones. The spur gear itself rides on a short shaft that also accommodates a single, plastic, disk brake that gets the squeeze from a pair of cam-actuated metal pads. Both ends of the car use dogbone drive axles to get the spin from the diffs to the wheels. Metal bush-

*The Prime 12 chassis layout keeps the receiver away from the fuel tank and is logically laid out for sensible linkage placement.*

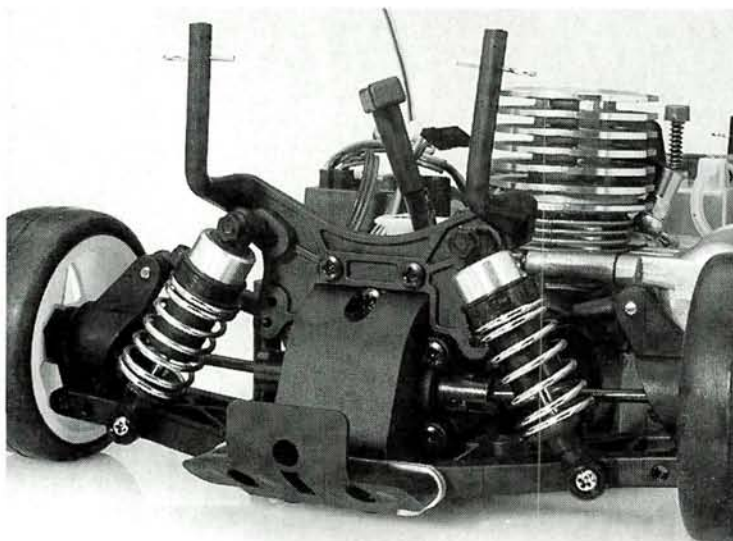


ings are used throughout, and both front and rear gearboxes feature metal, conical ring and diff gears.

- **Suspension.** The capable Prime 12 has one-piece lower arms with adjustable upper camber rods. All four suspension arms are equipped with ride-height adjustment screws and use captured hinge pins—no E-clips! The plastic, oil-filled dampers are acceptably smooth. Snap-on-clip spacers adjust spring preload and ride height.



*The gear diffs are fully enclosed; try that with belt drive! Shaft-driven cars like the Prime 12 are impervious to parking lot debris. The car's plastic shocks operate smoothly. Note that the front bumper captures the hinge pins, so there's no need for E-clips.*



*Molded shock towers are used at both ends; graphite versions will be offered, but the stock units are fine for all but the highest levels of competition.*

• **Body.** A slick Toyota Supra body wearing Castrol colors graces the Prime 12, and a horde of stickers enables the modeler to easily mimic the full-size car's unique look.

• **Engine.** Mugen Seiki's VX-12 pull-start engine delivers the power and performance that will delight beginners and may surprise most veterans.

Unlike most twelves, the VX mill uses a slide carb instead of a more typical barrel unit. A small muffler quiets the powerplant as it pressurizes the fuel tank, and a single-element air filter does a good job of keeping the nasties out of the engine. Performance is fully tunable with high- and low-end carburetor-adjustment needles. The low-end needle is factory set for break-in and running.

### TEST GEAR

I fitted the radio tray with some of Airtronics' finest servos. A quick 94155 made for a very responsive throttle and brake while a torquey 94157 yanked the front wheels with authority.

Dynamite's 5-cell receiver pack delivered 6 volts of power to the tiny Airtronics 92836 receiver, and an



**Airtronics FM radio gear was installed in the Prime 12; although it isn't required, an FM radio set is especially good for gas vehicles.**

Airtronics 3PS radio kept everything under control. Traxxas' 20-percent-nitro Top Fuel filled the tank, and with that, I was ready to go.

### PERFORMANCE

After a couple of tanks' worth of break-in, I started to lean out the Mugen's easy-to-start VX engine, and it really came to life. With the engine close to fully broken in, I started to drive aggressively.

First, I noticed the push. A quick look-over identified the problem: the rear ride height was below level and was giving the rear too much traction. I popped in a couple of spacers to raise the rear, and handling improved immediately.

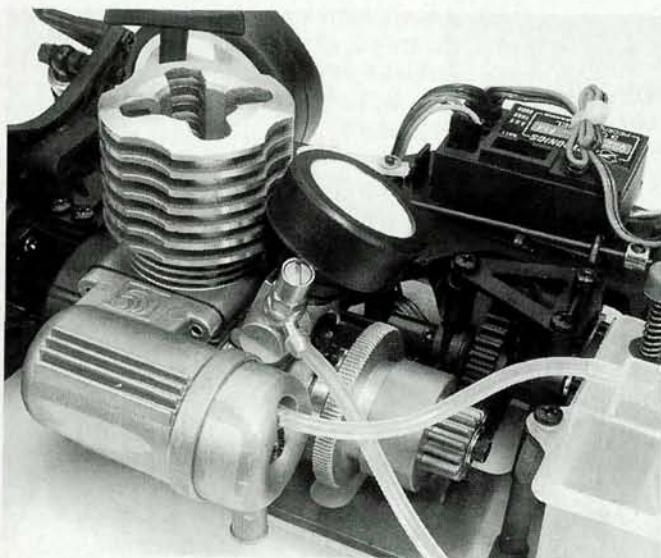
I was now able to drive much tighter lines and exit the turns right where I wanted to. The

### Likes

- Sweet body and cool stickers.
- Excellent performance-to-dollar ratio.
- Engine runs great.

### dislikes

- Instructions don't show step-by-step assembly; only an exploded view of the car is provided.
- Decals required special care to fit properly.
- Bearings not included.



**The VX-12 is a reliable performer and well equipped, too; the slide-valve carb and heat-sink heat are stock. The shorty air filter has a large element for easy breathing.**

kit's tires worked well on the asphalt test track and gave surprising traction.

The Prime 12's brakes stopped the car with authority; there's plenty of wheel-locking power, especially with the strong Airtronics servo. I plan to go for a thicker, stiffer setup when racing season opens, but the stock setup works great, and non-racers should be more than satisfied with the performance.

### FINAL THOUGHTS

Sedan racing is tons of fun, but it's even more exciting with nitro power in the mix. The Prime 12 delivers performance, handling and price. It's competitive out of the box, but add some hop-ups, and it's capable of some really blistering laps.

Mugen will soon release a hard-anodized, countersunk chassis, graphite shock towers and radio tray, heat-sink engine mounts and more. Sounds hot! We'll have to do a "2nd Look" on this car when the hop-ups arrive.

\*Addresses are listed alphabetically in the Index of Manufacturers on page 217.

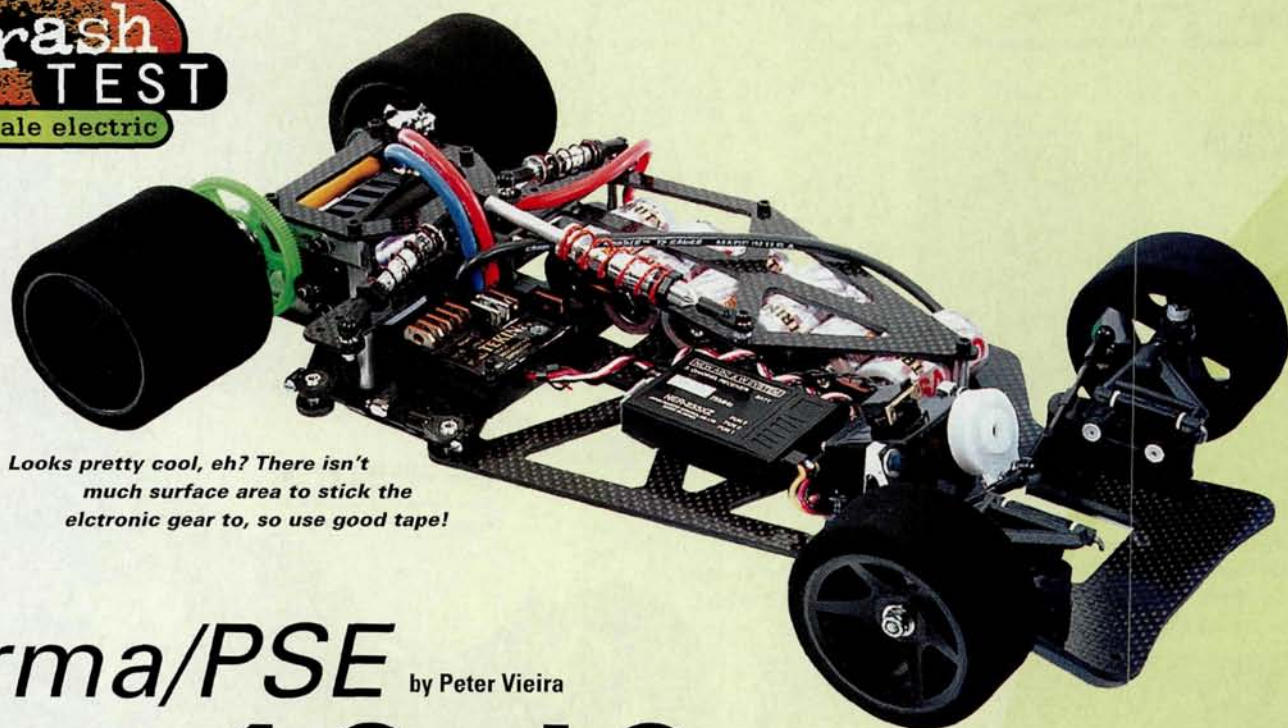
### THE COMPETITION

	HPI NITRO RS4	OFNA NITRO Z-10	Kyosho GP SPIDER MKII	Mugen PRIME 12
Wheelbase	10.75 in.	10.28 in.	10.25 in.	10.25 in.
Width (F/R)	7.5/7.75 in.	7.32/7.20 in.	7.9 in.	7.5 in.
Weight	3 lb., 11 oz.	3 lb., 4.17 oz.	3 lb., 4 oz.	3 lb., 10.5 oz.
Diff type	Bevel gear	Ball	Bevel gear	Bevel gear
Brakes	Disk	Composite disk	Disk	Composite disk
Exhaust	Header and pipe	Muffler	Expansion	Expansion
Price	\$329	\$260.95	\$339	\$355.99
Available at*	\$209.99	\$239.99	\$249.99	\$219.99
Issue reviewed	6/97	—	—	7/98

\*Prices vary.

# thrash TEST

1/10 scale electric



*Looks pretty cool, eh? There isn't much surface area to stick the electronic gear to, so use good tape!*

## Parma/PSE by Peter Vieira Phaze 1 Oval Car

### s p e c s

SCALE 1/10  
LIST PRICE \$425

DIMENSIONS (chassis only)  
Length overall 13.5 in.  
Wheelbase 10.5 in.  
Width (F/R) 7.25/7.75 in.

WEIGHT  
Gross, RTR 2 lb., 9 oz.

CHASSIS  
Type Pan  
Material Carbon fiber

DRIVE TRAIN  
Type Direct drive  
Primary Pinion/spur  
Transmission Solid axle  
Differential(s) Ball  
Bearings/bushings Bearings

SUSPENSION  
Front—type Associated  
Dynamic/coil spring  
—damping Friction  
Rear—type Delta shock  
—damping Oil

WHEELS  
Front/rear PSE Velocity

TIRES  
Front/rear Blue-compound foam

ELECTRICS (not included)  
Motor Trinity Midnight 2  
Battery Trinity VIS-2000  
ESC Tekin G-9



# Testing the **LATEST** left-turn **CONTENDER**

**U**nlike off-road racing, in which the effects of minor changes to the vehicles are diluted by the terrain, oval racing is a game of subtleties: every element of vehicle design and equipment selection has a measurable effect on a machine's lap times. With that in mind, few cars remain "stock" in the world of oval racing; modifications and upgrades rule the day.

Parma/PSE's\* new machine, however, looks ready to win right out of the box and has many popular aftermarket choices included as stock equipment. Of course, there's more to this car than nice goodies. The crew at PSE have delivered a thoughtful design that seems to have been created with an eye on convenience as well as on adjustability and performance. Interested? Let's hit the carpet with the Parma/PSE Phaze 1.



*Few R/C machines look as potent as an oval car. The Phaze 1 is no exception; it was designed to go fast, and it shows.*

## **KIT FEATURES**

- **Chassis.** The Phaze 1 makes liberal use of  $\frac{3}{32}$ -inch carbon-fiber plate, in particular for the main chassis, battery brace, motor pod top and bottom plates and damper support. These pieces are exceptionally well finished and have a high gloss and perfect cuts—no stray fibers here.

To save weight, the main chassis has been liberated of much unnecessary material, but not so

much that strength is compromised. If anything, the Phaze 1 is one of the more solid-looking cars out there. The Phaze 1's visual trademark is its wide battery brace, which uses three screws to hold the cells tightly against the chassis' extra-wide battery slots. The seven slots permit fore and aft pack positioning, but if the pack is fully aft, it must also be fully outboard in the slots (the rear-most slot is not as wide as the others because of the space needed for the motor pod's main pivot).

PHOTOS BY WALTER SIDAS

• **Front end.** PSE chose to equip the Phaze 1 with what must be the most ubiquitous front-suspension system for pan cars: Associated's Dynamic unit. No matter where you race, you'll find parts for this front end on the hobby-shop wall. PSE includes the latest fiber-reinforced Associated parts, and—not content to leave well enough alone—has also added extra-long kingpins and front-suspension springs from Wolfe Motorsports. The resulting long-travel setup is remarkably plush and should deliver gobs of traction without soft tires. Harder tires offer less rolling resistance, and that means faster laps—at least on paper.

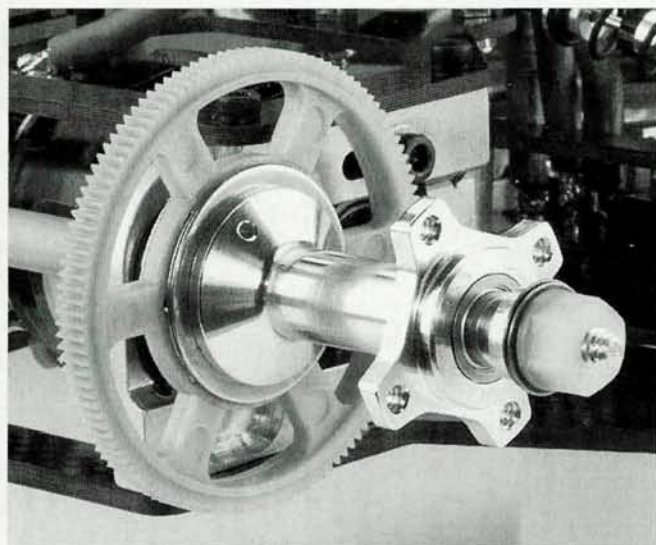
Conspicuously absent from the front end is the aluminum cross-brace typically

*Associated's tried-and-true Dynamic front end keeps the Phaze 1 heading in the right direction controlled by Hitec's potent 235AG miniservo. The Wolfe Progressive front-suspension springs and kingpins are just visible inside the rim.*

couldn't use the piece because the Phaze 1 offers only two holes for each arm, not the usual three-hole pattern used on cars with Associated front ends. Will any of this matter? The track will tell the tale.

• **Rear suspension.** The Phaze 1's rear sports three Delta shocks. An oversize center unit handles fore-and-aft damping and controls ride height, while two smaller lateral units adjust tweak and roll damping. This system eliminates the need for a T-plate and substitutes a central pivot ball and a single turnbuckle linkage on the right side of the chassis to articulate the motor pod. The oversize titanium turnbuckle permits roll-steer (axle angle) to be adjusted, but it's best to start with the rear axle perpendicular to the chassis' centerline.

• **Drive train.** The motor pod itself uses the familiar aluminum motor plate and plastic left



*The IRS differential and axle assembly combined with PSE's bearing-supported Rocket Sprocket spur gear (included) make for a smooth, true drive train.*

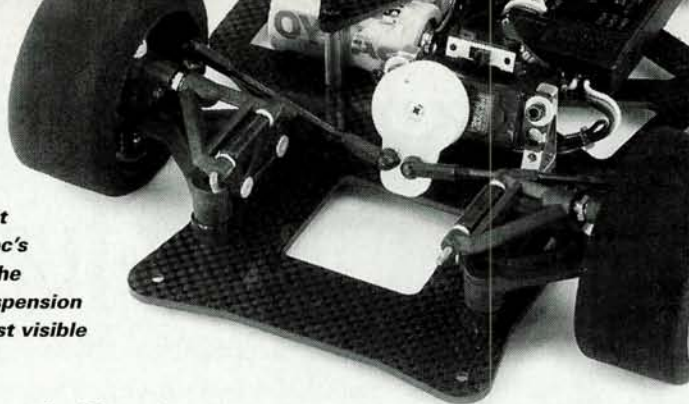
## THE COMPETITION

	Motorsports Head Hunter	Hyperdrive/PTI SSE	Trinity Switchblade 10SS	Associated RC10L20	Parma/PSE Phaze 1
Wheelbase	10.1 to 10.5 in.	10.25 in.	10.5 in.	10.5 in.	10.5 in.
Width (F/R)	7.25/7.75 in.	7.2 in./7.85 in.	7.25 in./7.75 in.	8 in.	7.25/7.75 in.
Weight	2 lb., 6.7 oz.	2 lb., 10.5 oz.	2 lb., 10 oz.	2 lb., 13 oz.	2 lb., 9 oz.
Diff type	Ball	Ball	Ball	Ball	Ball
Chassis	Graphite	Graphite	Graphite	Graphite	Carbon fiber
List price	\$399.95	\$285.95	\$299.99	\$260	\$425
Available at	NA	NA	\$189.99	\$139.99	\$280
Reviewed in	6/98	—	7/97	7/97	—

\*Prices vary with location.

used with the Dynamic front end, although the necessary mounting holes are molded into the upper arm mounts. Foregoing the aluminum brace, I thought a second-best solution would be to install the carbon-fiber strap brace included with the Associated front end (but not mentioned in the PSE instructions). This brace ties the two suspension arms together at the riser blocks, and it would have helped stiffen the front of the chassis, but I

bulkhead from Associated's original RC10L series sandwiched between carbon-fiber top and bottom plates. The usual offset-hole ride-height adjusters are in place, but the axle that rides in them is not the typical stick o' graphite. Instead, PSE supplies a top-quality Irrgang Racing Service (IRS) unit. The fiberglass axle is incredibly true to ensure a wobble-free ride, and the left hub is a two-screw clamping unit (who could bear to gouge



that trick yellow axle with a setscrew?).

The polished, machined diff hub is a work of art, and diff-pinning material to mate with the pre-drilled hole for the diff pin is included. Oddly enough, the diff rings are not notched, so I'll have to pick up some rings and pin the diff at the track.

• **Wheels, tires and body.** The Phaze 1 is fully equipped with PSE's Velocity wheels and green-dot foam tires. This is purely subjective, but I think the svelte, 6-spoke look of the Velocity hoops makes them the most attractive pan-car wheels going. (Yes, it's performance that counts; these wheels are plenty stiff and roll true, thanks.)

The PSE body is a nicely molded Pontiac Grand Prix. Ordinarily, I'd farm the body out to Motion Graphics, Bich'n Bodies, or our own Greg Vogel, but they were all tied up. The paint job shown on these pages is straight from a few cans of Pactra paint.

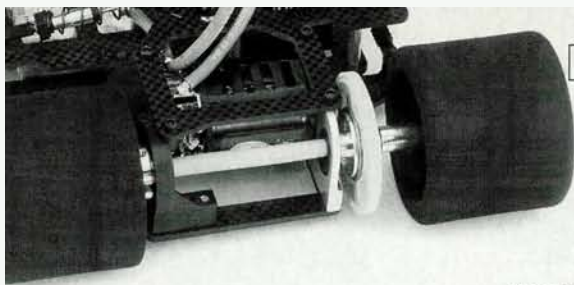
## TEST GEAR

Since I planned to test the Phaze 1 by racing it in the stock class at SK Hobbies in Rhode Island, I outfitted it with the hottest stocker in the *R/C Car Action* arsenal: a Trinity\* Midnight 2 Pro. A set of Trinity's VIS-matched 2000 cells was a natural for go-power, and Tekin's\* stalwart G-9 ESC was assigned to keep the juice under control. Hitec's\* powerful, fast HS-235AG miniservo got the nod for steering control.

Finally, a JR\* NER-233XZ PCM receiver was taped in to match my oldie but goodie JR 756 radio. That takes care of the in-car gear, but everybody knows that you don't race on carpet with car and radio alone; you have to have traction compound! I boosted a can of David Spashett's\* Tangerine Tyre Tack from Chris Chianelli's "Inside Scoop" bin, loaded my bag and hit the track (OK; I hit the track three hours later; it's a long drive).

## PERFORMANCE AND SETUP

If you're ever in Johnston, RI, be sure to have your oval car with you. SK Hobbies indoor banked oval is a fast piece of carpet with a good bunch of guys who like to go fast and have fun—highly recom-



## PARMA/PSE PHAZE 1 OVAL CAR

*The Midnight 2 Pro's cooling slots are visible through the pod's top plate. Also visible are the lateral Delta shocks and IRS axle—good stuff.*

mended. With that plug, let's get down to business ....

I unpacked my gear, and the Phaze 1 started to get some curious looks. Everyone liked the no-tape battery setup, and the IRS axle and diff were instantly recognized as topnotch stuff. The number-one question was, "Have you run it yet?," and I hadn't. No one was shy with setup advice, however, and the fun began. Here's how the night went:



*This beefy battery brace grips the cells tenaciously but allows quick access. Note that the damper shares its mounting screw with the brace.*

Even before I put the car on the track, I swapped the right front green-compound tire for a blue-orange. I set the left front wheel with about 2 degrees of positive camber and the right front with 2 degrees negative (I say "about" because I left the ole RPM camber gauge at home. It's always something ...). The car felt OK, but not "locked in." I tried the tires down until I had 1/8 inch of rubber on each hoop. The car felt better, but too slow. I didn't gear up to compensate for the smaller tire diameter; I went back to the pits and replaced the 25-tooth Robinson pinion with a 27, then I finished off the pack.

I tried a blue left front tire just to see whether the car would get through the corners faster, but after a couple of laps, it was hooking badly, even though it should have had less steering. I took the car back to the bench and found the source of the trouble: the standoffs that support the rear brace and pod pivot had loosened, allowing the pod to swing from left to right a degree or so. I tightened the screws and added a drop of

thread-lock for good measure.

When the A-main was in the record books, I caught up with Nick Deroce, the winner and new track record holder. I wanted to take my driving skills out of the equation and have Nick run a pack through the car. Nick had been turning 3.5-second laps with his usual car, but he was a couple of tenths off the pace with the Phaze 1. "It's not set up right; this track is tough to dial-in for," he pronounced.

I asked Nick whether he would like to keep the car for a while and race it, and he jumped at the chance. I think Nick's willingness to shelve the car that just set the track record in favor of running the Phaze 1 shows his confidence in the car. I'll have Nick's setup and plenty more races under my belt by the time this hits the newsstand; email me at



*The hottest chassis in the world is of no help if your electronics cheese out, so reliability is a must. My trusty JR-756 PCM radio gear and Tekin's bombproof G9 have yet to fail me.*

## Likes

- Wolfe springs and kingpins, IRS diff and axle, PSE body, PSE Velocity wheels and Kimbrough servo-saver—all included.
- Unique design with well-crafted carbon-fiber components.
- Easy to adjust and work on.

- Front-end brace not included.

## dislikes

peterv@airage.com for an update and setup tips.

## THE FINAL ANALYSIS

Given Nick's performance with the Phaze 1 and his faith in it, it's clear that this car is a contender. No problems ever materialized as a result of the un-braced front

## BUILDING & SETUP TIPS

Although the most complex oval car is still much simpler than any off-road racer, most oval drivers spend more time building their cars than off-roaders do; there is much to be gained by careful setup and much to be lost if the job is rushed. Take the time to build the Phaze 1 right!

■ Step 9: when cutting down the pivot-ball sockets, mount the sockets on the pivot-ball brace, then use a grinder or a rotary tool to remove the material until it is flush with the brace's flat edge. This will prevent you from removing more material than you need to.

■ The 4-40 swivel ball end that joins the center shock to the battery brace is a bit long; with the pod at level ride height, there was scarcely 2mm of travel left in the shock. I trimmed about 5mm off the swivel to shorten the shock's overall length, and this fixed the problem.

■ Make certain the bearing that is pressed into the spur gear is centered within the gear's width, or the diff will bind. When pinning the diff, be sure the pin does not extend past the diff ring and interfere with the spur gear.

■ The chassis is not pre-drilled for the servo mounts. Before you drill, take your time and mark the holes' positions carefully! I opted to use low-profile button-head screws to secure the mounts, as I do not have the correct bit to countersink the holes for pan-head screws. If you can't live without a perfectly smooth chassis, buy the necessary Niftech\* tool.

## YOU'LL NEED

- 2-channel radio with ESC.
- 6-cell pack (LTO configuration).
- Stock or modified motor, depending on class.
- Pinion gear (64 pitch).
- Shock oil (30WT and 40WT).
- Battery charger.
- Polycarbonate-compatible paint.

end, and the car ran well out of the box, and any driver will appreciate the Phaze 1's ease of adjustment off the track.

Battery changes are quick, no-tape affairs, and the cells are held securely; you don't even need to Shoe-Goo the cells together.

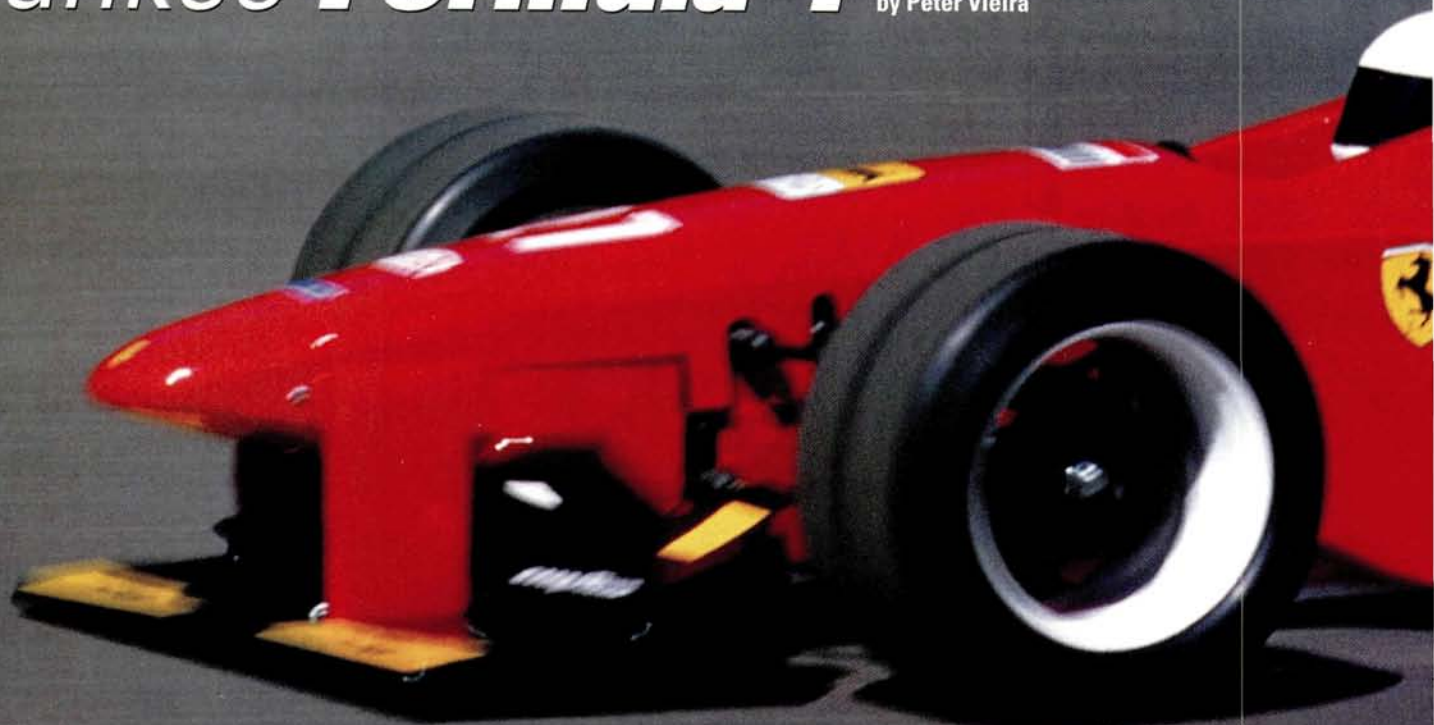
The triple shocks' threaded bodies make adjustments to tweak and ride height simple. And of course, the Associated front end is easily adjusted for camber and caster.

The car is easy to build, the upgrade parts you might wish to buy with another car are already included, and the kit parts are very high quality. If you want to go fast on an oval, the Phaze 1 offers a good way to do it.

\*Addresses are listed alphabetically in the Index of Manufacturers on page 217.

# Yankee *Formula 1*

by Peter Vieira



*Greg Vogel in GO mode. He came along for the testing; I didn't have to ask twice!*

WHEN I CHECK out a hot new car, I do what anyone else does; I pick it up, turn it in my hands, examine it. Not so with the Yankee\* F1. If you want to look at this 1/4-scale behemoth, you walk around it. If you want to turn it in your hands, you're in for a workout; it weighs over 30 pounds. It's big, plain and simple, and that means big fun. Ever wanted to try one of these giants yourself? (silly question). Turn the page and take the wheel.

PHOTOS BY WALTER SIDAS



# Bigtime

## THE KIT

• **Chassis.** Who ordered the refrigerator? The Yankee arrives in a giant box worthy of a household appliance—all the better to contain the pre-built chassis. The car is built around a 1/8-inch slab of aluminum that serves as the main chassis plate. Aluminum bulkheads support the rear suspension components and rear differential; the bulkheads would be quite heavy if left solid, so Yankee has dutifully machined away all excess material. The aluminum chassis plate extends past the engine but stops short of the machine's nose; a thick plastic riser elevates a separate nose piece made of 1/16-inch aluminum.

As with the rear of the car, thick bulkheads support the front suspension pieces, but these are made of reinforced plastic instead of aluminum. A support for the F1 body's nose is cantilevered off the front bulkheads and features rigid

plastic vanes to hold the front wing. The area beneath the body's side pods is filled by thick plastic side plates, and aluminum nerf bars protect the sides of the chassis.

• **Suspension.** There's plenty of room for scale construction on a car as immense as the Yankee, and the suspension takes full advantage of this. Like the real thing, Yankee's F1 features dual inboard rear shocks that are completely enclosed by the bodywork. The oil-filled, coil-over dampers are similar to those we are all familiar with from 1/10 cars, only much larger. The shocks are actuated by means of a cam that's connected to the multi-link wishbones that support the hubs. A separate link adjusts rear toe-in (independent for each hub), and the suspension cams feature setscrews that are used to adjust ride height. The front suspension is similar, but uses a monoshock design.

Both the left and right suspensions activate the same cam, and this causes the front suspension to act as if it has a very stiff swaybar: when the right-side suspension arm is lifted, the left rises as well. All four hubs of the Formula 1 are mounted on the suspension via massive pivot balls, and the front hubs feature inboard bearings for the front axles; there are no bearings in the wheels themselves.

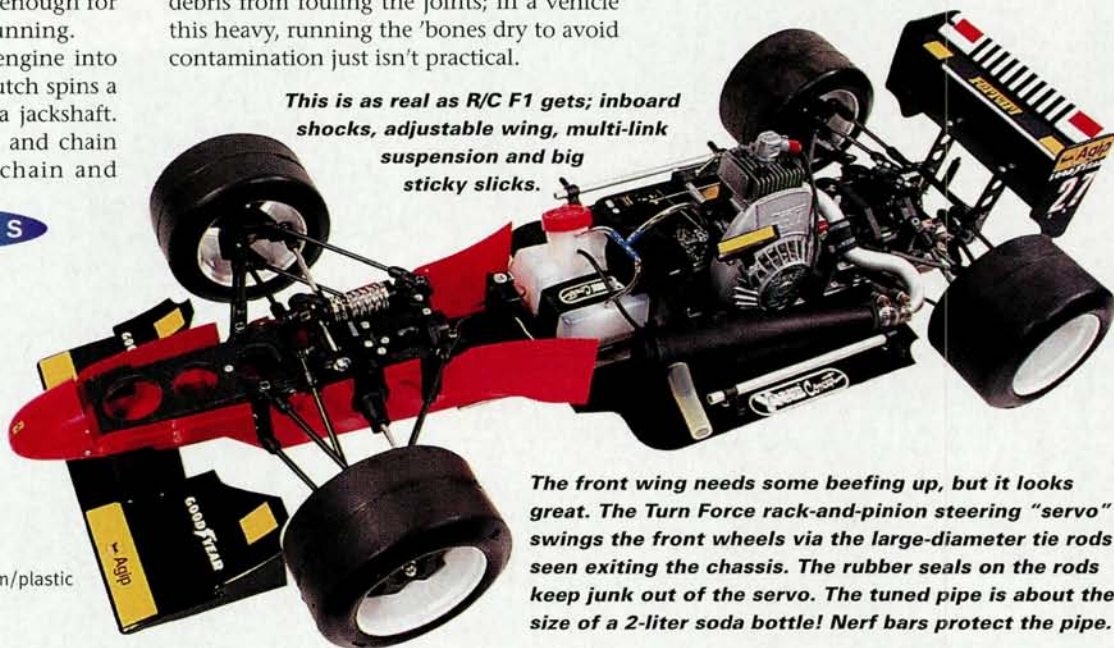
• **Engine and drive train.** Yankee's own F1 engine drives the Formula 1. The 2-stroke, 25cc powerplant features electronic ignition timing with a conventional spark plug and a lawnmower-size pull-start. Although engineered exclusively for hobby use, the engine is not unlike the units found in chain saws—heavy-duty stuff. A suitably large air filter is zip-tied over the butterfly-valve carb, and a manu-

al choke is used to fire the engine. The included pipe and manifold resemble their 1/10- and 1/8-scale counterparts, only larger. The fuel tank is mounted ahead of the engine and holds 1/2 quart of pre-mix (regular automotive gasoline and 2-stroke oil—4 ounces to every gallon), enough for over half an hour of nonstop running.

To get the power from the engine into the rear wheels, a centrifugal clutch spins a spur gear that is connected to a jackshaft. The jackshaft drives a sprocket and chain that spin the rear diff. The chain and

sprocket fall just short of bicycle-size hardware, and oversize bearings keep everything spinning smoothly. The differential reaches out to the rear wheels through conventional dogbones, but Yankee houses these in thick rubber boots to prevent debris from fouling the joints; in a vehicle this heavy, running the 'bones dry to avoid contamination just isn't practical.

*This is as real as R/C F1 gets; inboard shocks, adjustable wing, multi-link suspension and big sticky slicks.*



*The front wing needs some beefing up, but it looks great. The Turn Force rack-and-pinion steering "servo" swings the front wheels via the large-diameter tie rods seen exiting the chassis. The rubber seals on the rods keep junk out of the servo. The tuned pipe is about the size of a 2-liter soda bottle! Nerf bars protect the pipe.*

## s p e c s

SCALE 1/4  
LIST PRICE \$1,895

**DIMENSIONS**  
Length overall 41 in.  
Wheelbase 28 in.  
Width (F/R) 21 in.

**WEIGHT**  
Gross, RTR 30 lb.

**CHASSIS**  
Type Aluminum/plastic plate

**DRIVE TRAIN**  
Type Chain  
Primary Clutch bell/spur  
Transmission Dogbone drive axles  
Differential(s) Bearings

**SUSPENSION**  
Type (F/R) Multi-link wishbone  
Damping Inboard coil-over, oil-filled shocks

**WHEELS**  
Type (F/R) Molded plastic  
Dimensions (DxW, F/R) 4.5x3.5/4.5x4.25 in.

**TIRES**  
Front/rear Semipneumatic slicks

**POWERPLANT**  
Engine Recoil-started 25cc  
Yankee F7  
Pipe Aluminum tuned pipe

It takes some beefy brakes to haul this monster down from top speed, and Yankee delivers with a massive single disk brake for the rear wheels. The fiberglass disk is fixed to the drive shaft and is about the size of a peanut-butter-jar lid. A pair of thick steel pads grab the disk to slow the car, actuated by a single servo that also handles throttle duty.

• **Radio gear.** Custom Electric Cars\* (CEC), Yankee's distributor, offers the F1 as a turnkey vehicle complete with Futaba 3PDF radio, and that's how our test vehi-

I'll give myself lots of room when I test the binders; I sure don't want to wad this nearly \$2,000+ vehicle.

There isn't a steering servo—at least, not in the conventional sense. Yankee includes its unique Turn Force steering, which is actually a motor-driven rack-and-pinion system. Heavy-duty boots seal the tie rods that emerge from the unit's juice-box-size case, and it packs some serious muscle—more than a conventional receiver battery pack could handle for more than a few laps. A chunky 5-cell pack of sub-C cells is used instead, so there's no worry of the receiver pack dumping during the car's lengthy run times.

• **Body and wings.** In the usual R/C car style, the Yankee F1 features a clear polycarbonate body—a multipiece design that allows the shell to duplicate the wrap-around nose of the full-scale cars (impossible to do with a one-piece vacuum-molded body). The front wing is also polycarbonate and is mounted on a rigid shelf suspended from the body's nose by plastic vanes. To generate downforce for the drive wheels, a functional bi-level rear wing with adjustable upper and lower elements is mounted on the rear bulkheads.

## PERFORMANCE

It goes without saying that a car this size requires a lot of room to run. Greg Vogel and I trekked off to a local movie theater during a couple of nice mornings (out of the office—whoo-hoo!) for the shake-down runs.

## BUILDING & SETUP TIPS

■ Our Yankee Formula 1 arrived assembled with radio installed. We had only to paint the body, and that's no small task. It's not difficult (especially in solid red Ferrari trim), but there is a lot of space to cover. We've all sprayed quick 'n' dirty paint jobs in too-small spaces without a respirator, but for safety's sake, do it right with this big body. If weather permits, spray outside. If you must work indoors, be sure the area is well ventilated, and wear a respirator mask. Take frequent breaks, too; if you paint the body all in one shot, you'll have a dangerous volume of flammable paint mist hanging in the air.

■ The included oversize receiver pack features a Tamiya plug for easy charging. Use it frequently! The Yankee is a heavy piece of equipment that can cause real damage if it runs away, so don't even think of running it if you're uncertain of the receiver pack's charge status. If you have a radio with a fail-safe feature, use it.

■ The Yankee will draw crowds. Keep them away from it! Even though it's huge, little tykes still identify the car as a toy (the biggest, coolest toy in the world) and will want to get closer than they should. Be patient with all the questions you get from onlookers; remember when you got started in the hobby?

## YOU'LL NEED

- 2-stroke pre-mix oil.
- Gasoline-safe fuel container.
- Heavy-duty receiver pack.
- 2-channel radio (FM highly recommended).
- Turn Force steering servo or suitable 1/4-scale servo.
- Paint for polycarbonate body (it's big; buy a few cans!).

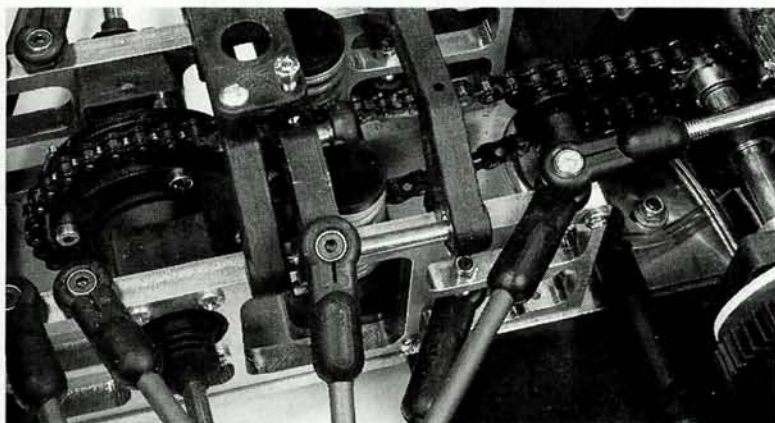
Our first trip out was a bummer; for some reason, the carburetor wasn't taking fuel. Greg took apart the carb and found the problem: a gasket had been installed improperly, and that prevented the fuel from being pressurized by the crankcase—sort of like the effect you get when the pressure hose that runs from the pipe to the fuel tank of glow-powered car comes loose. Problem solved, we schlepped out to the parking lot again the next day.

On day two, it took only a couple of tugs for us to get the F7 engine burbling contentedly. Although we were both chomping at the bit to yank the throttle, sanity reigned and we let the engine warm up with a few lazy circles around

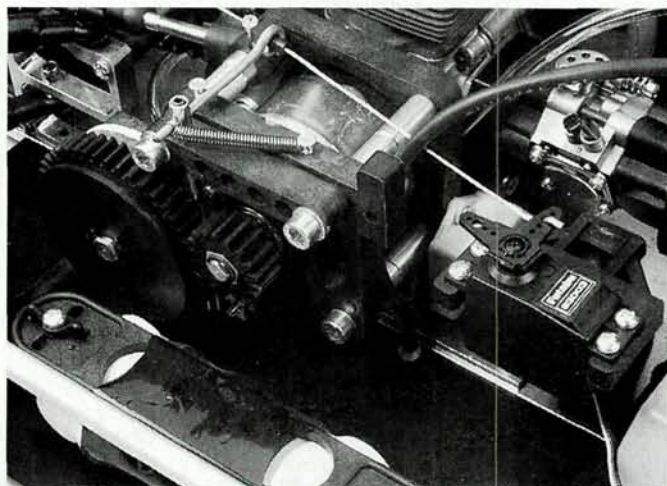
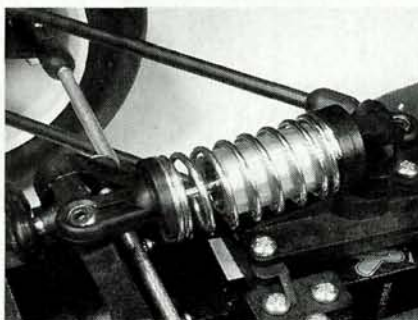
I cranked it up and tossed the car around. Sawing the wheel back and forth, I slalomed around imaginary traffic. For such a hefty machine, the F1 is very nimble; you can feel the mass swinging around, but it doesn't require a lot of input from the wheel to maneuver. The powerful Turn Force "servo" no doubt helped in producing that light feel.

What about that lightweight brake servo? It actually worked well; with the large disk and

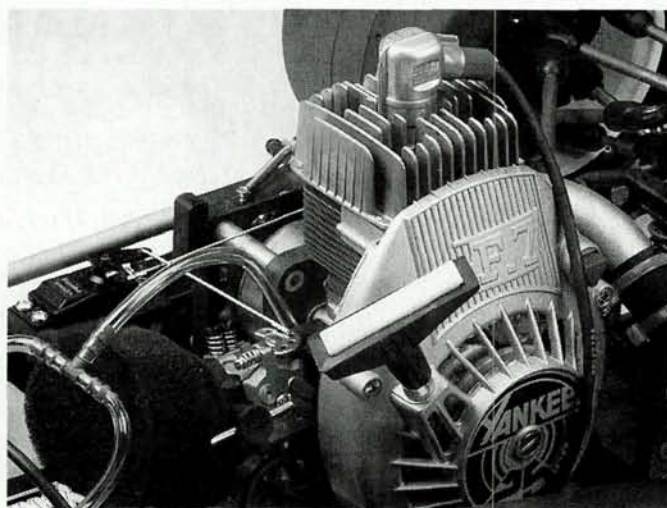
the flexible front wing, which tended to scrape the ground no matter how we tweaked it. A fiberglass stiffener would



**Above:** here's the Yankee's chain drive. The four-bolt diff features rugged planetary gears. Note the boot that seals the dogbone drive axle—just visible as it emerges from the bulkhead. **Right:** a large-capacity monoshock damps the front suspension. Note that the links that articulate the shock are joined by a single rocker bar.



**Above:** Futaba's S3003 servo is dwarfed by the Yankee's drive-train parts. Five sub-C Ni-Cds power the radio gear and are secured by a molded strap. **Below:** Yankee's own 25cc mill is bolted into the F1. No nitro for this bad boy; automotive gasoline and pre-mix are what this engine thirsts for.



the lot. With a few carburetor tweaks, the Yankee F1 was deemed "all systems go," and Greg dumped the trigger (we flipped for the first drive dibs). The motor hiccuped for just a moment, then quickly spooled up, shooting the big F1 across the lot in a hurry. Greg kept his finger in it until the car wound out at 45mph (my guess). I could feel the weight of the car as it cornered, and I wasn't even driving!

The car looked a little loose, so Greg took it easy until the tires heated up. We could actually hear them hooking up as the rubber warmed and softened. Greg at last handed me the radio (my turn; my turn; my turn!) and I was off. My first feeling was one of, well, responsibility. This car is big, heavy, expensive, and *not mine!* I found myself driving much more conservatively than I would with any 1/10 car, but, a man's gotta do what a man's gotta do.

caliper providing so much surface area, it really doesn't take too much of a squeeze to slow the car. Modulation was good, and the brakes could be locked as long as we were a few clicks off top speed. The only unappealing part of the package was

cure the problem. Wing notwithstanding, we both had a blast tearing around with this beast. Now, if only we could find a place to race it ....

## FINAL THOUGHTS

Big car, big fun ... big price tag. That's the big bummer here; too few of us will get to own a 1/4-scale car. But if you have the dinero to jump into Q-scale, this has to be some of the most fun you can have with a transmitter in your hands. If you're an F1 fan, you'll really dig it. I can't say I've driven Michael Schumacher's car, but this has to be the closest thing to it in R/C. Fast, nimble and brutishly powerful, Yankee's F1 is just 25 percent of the real thing, but it feels more like 99.

*\*Addresses are listed alphabetically in the Index of Manufacturers on page 217.*

## Likes

- It's big, and big is good.
- Purpose-built Turn Force steering system.
- Scale construction.
- Looks great inside and out.
- Long run time.

- Expensive.
- Front wing should be stiffer.
- A fluke, but missing a day of running due to a reversed carb gasket was a letdown.
- Requires a lot of space to run.



## dislikes



Below, left to right: Pro-Line president Todd Matsen, Team Associated factory driver Jason Ruona, trophy girl Danielle Derrek, Team Associated factory driver Scott Hughes and Scottsdale R/C Speedway owner Emmett Mitchell.



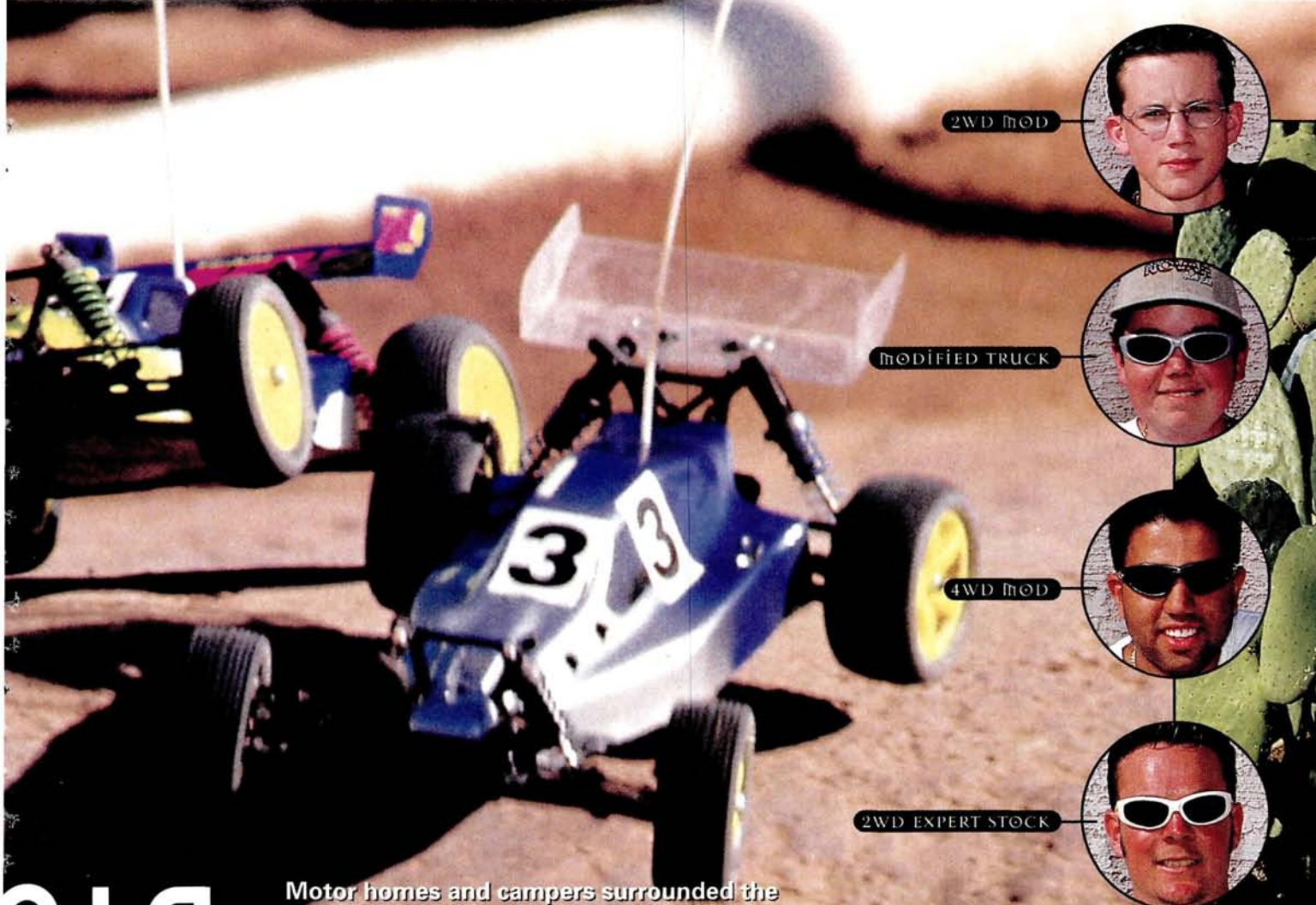
12TH ANNUAL

**W**HEN THE SEASONS change and winter turns to spring, racers pack up their R/C cars, grab the sun block and head out to beautiful Scottsdale, AZ, to attend the Pro-Line/Radio Control Car Action Cactus Classic. After 12 years, the Cactus Classic is still one of the most popular racing venues, and it's frequented by racers from all around the country.

## Pro-Line & R/C Car Action

# CACTUS CLASSIC





2WD MOD



MODIFIED TRUCK



4WD MOD



2WD EXPERT STOCK



EXPERT STOCK TRUCK



SIC

Motor homes and campers surrounded the rustic outdoor Scottsdale R/C Speedway facility, and tents and tables were filled with racers, all of whom were enjoying the sunshine and 80-degree temperatures. As in past Cactus events, the weather wasn't the only thing that was hot; the racing action was scorching as local Arizona hotshoes defended their honor against some of the most talented drivers in the world.

## Desert racing à la R/C

by George M. Gonzalez



Team Losi and Team Associated brought most of their camp, so the locals had some serious competition on their hands. The Pro-Match and Hitec racing teams were also represented by some heavy hitters. If that wasn't enough, Pro-Line brought along a truck full of tires and Protoform bodies, many of which were awarded as prizes.



Here's a shot of Scott Hughes' Associated T3 sporting Protoform's new Dodge truck body. This photo was taken at the start of the A1 Modified Truck Main.

## A RACING OASIS

The Cactus Classic offers classes for drivers of all skill levels; those who were just getting started chose the Novice 2WD and Truck classes. Intermediate drivers chose the 2WD Stock and Truck classes; drivers with a lot of wheel time under their belts raced in the highly competitive Expert Stock 2WD and Truck. All classes were run according to ROAR rules, and any 24-degree motor and battery combination was allowed.

Modified 2WD, 4WD and Truck were reserved for sponsored and professional R/C drivers, and the names of Brian Kinwald, Matt Francis, Scott Hughes, Sohrab Tavakoli and Rick Hohwart were frequently heard over the PA system. All drivers had four qualifying rounds to put in a good run, and a single Main event determined the winners in all the stock classes. Three Mains determined the winners in Modified, and points were accumulated according to finishing positions (first=100 points; second=99 points; third=98 points, etc.). A driver's worst score was thrown out and used only in the event of a tie.

## STOCK QUALIFYING

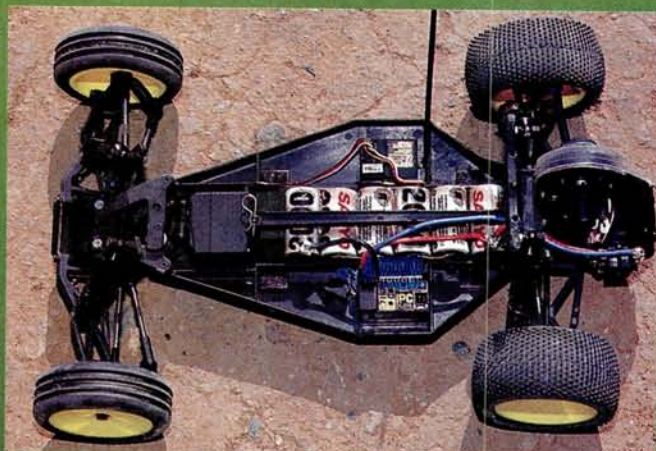
- **2WD Expert.** Peak/Team Losi-sponsored driver Jimmy Babcock set the TQ pace in the first round by posting a 12/4:04.85. During the following three rounds, Babcock wasn't able to better his time, but his first-round score was good enough to secure the TQ honors and a choice spot on the A-main grid. Albert Guardado, who did not start (DNS) in the first two rounds, managed to post a 12/4:08.93 in the fourth and final round to

take the spot next to the pole. Jerry Walker, Matt Ganske, Chris Koetsch, Ryan Maifield, Jacob Thome, Joey Stanovich, David Goss and Richard Lake all managed to post solid 12-lap runs and finished third through 10th respectively.

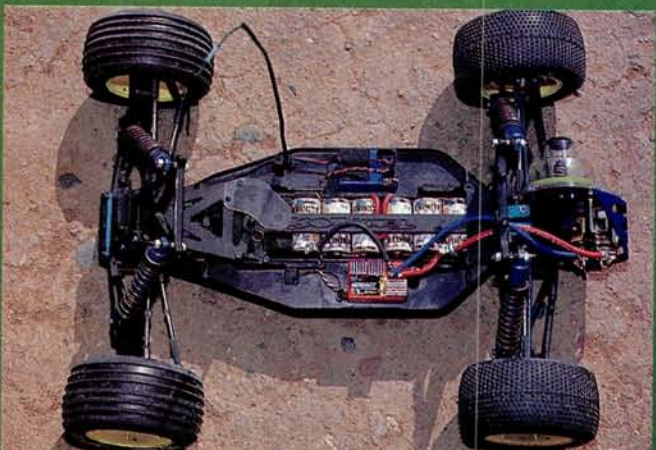
- **Expert Truck.** Joey Stanovich's Peak-powered Team Losi Double-X 'CR' was dialed in from the start and took the TQ honors in the first round of qualifying. Team Losi team manager Richard Trujillo's first-round performance was good enough to secure the second spot on the grid, while Team Losi/Peak-sponsored driver Justin Morrison qualified third. Brandon Rowland, Mike Friery, Nick Lasley, Brian Bosley, Pete Norman, Ben Aromin and Jacob Thome all posted 12-lap runs and qualified for the A-main.

## MODIFIED QUALIFYING

- **2WD.** Team Associated/Peak-sponsored driver and Arizona resident Jim Gard caught his competition off guard (pardon the pun) by posting a blistering 13/4:13.67 in the second round to take the TQ. Team Associated/Reedy factory driver



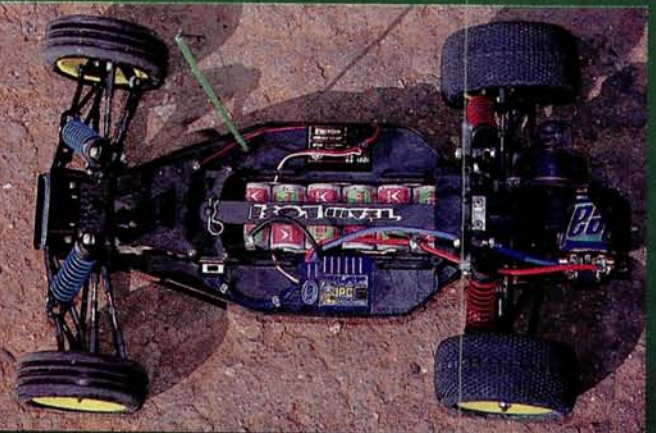
Scott Hughes' 2WD Expert Stock-winning Associated RC10B3.



Brian Kinwald's Modified Truck-winning Losi Double-X 'CR'.



Sohrab Tavakoli's 4WD Modified-winning Losi Double-X4.



Jimmy Babcock's 2WD Expert Stock-winning Losi Double-X 'CR'.

## UNDERDOG RACING TEAMS

While I was cruising around the pits, I ran across several reps from motor, battery and radio companies that have been making a strong showing in the racing scene. Jeff Roe from Pro-Match Competition Batteries\* has built a reputation on his matched racing cells and battery-discharging equipment. Pro-Match was represented by drivers in every single Expert Stock and Modified A-main event, and Justin Morrison used Pro-Match cells to capture the Expert Stock Truck Class.



The Garry Bennett Racing Motors racing team (left to right): David Goss, Garry Bennett and Jeremy Kobb.



The Pro-Match racing team: front row (left to right)—Jimmy Red, Jeff Roe, Blade Luna and Sean Baker; back row: Jason Morrison (left) and Jeremy Kobb. Missing from the photo are Jim Gard, Billy Caley, Brent Thielke and Jerry Walters.

Mike Mayberry from Hitec/RCD\* was on hand to offer radio and battery-charging advice and also had several drivers competing at the event. Hitec is not just a low-cost alternative anymore; the company offers competitive products that are designed to stand up among the best.

Garry Bennett from Garry Bennett Racing Motors\* has shown up at many large races and has provided many racers with potent stock and modified motors that get results. Garry also developed his own bearing and bushing lubricant called SC-9. Many Expert Stock and Modified drivers used Garry Bennett racing products to make the A-main.

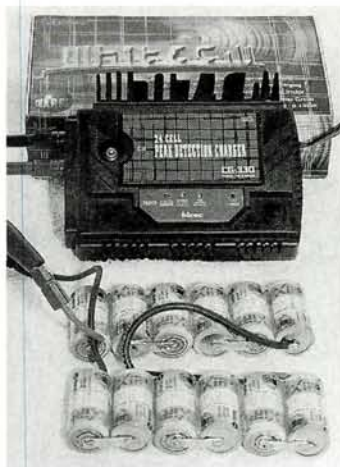
Scott Hughes was right behind with a 13/4:15.76, while Team Trinity/Losi factory driver Brian Kinwald took the third spot by posting a 13/4:17.46 best time in the final round. Team Losi/Maxtec factory driver Sohrab Tavakoli, Team Losi/Trinity factory driver Matt Francis and LRP-sponsored driver Brent White were also extremely competitive and managed to turn in 13-lap heats.

- **Truck.** Brian Kinwald was the most consistent driver, but was barely able to edge out Jim Gard and Sohrab Tavakoli for the TQ honors; less than 2 seconds determined the qualifying order in this class. Team Associated/Reedy driver Billy Easton also raced competitively and was the only other driver to turn 13 laps.

- **4WD.** The competition was extremely fierce! Sohrab Tavakoli and Peak company owner Rick Hohwart had to split hairs to sort out the TQ honors after posting identical 13/4:02 scores. Tavakoli ended up taking the pole position, while Hohwart had to settle for the second spot. Team Losi/Pro-Match-sponsored driver Brent Thielke and Team Losi driver Alex Guerrero qualified third and fourth, respectively.

### STOCK A-MAIN

- **2WD Expert.** Top qualifier Jimmy Babcock shot out in



**Check out Hitec's new DC-powered CG-330 24-cell peak charger. That's right; this charger can charge up to four 6-cell battery packs at a time while also quick-charging your glow-plug igniter. The CG-330 features a completely variable charge rate (from 0.5 amp to 5 amps) that allows you to charge anywhere from 4 to 24 cells at the amp rate you desire. The glow-plug igniter (1 cell) charges at 1.1 amps, which means you can quick-charge your glow igniter in about 30 minutes. The charger also features reverse-polarity and low-battery warning indicators, as well as power and charge LEDs, so operation is safe and fool-proof. Call your local hobby shop or Hitec for more information.**

front and never looked back; however, the battles for second, third and fourth were fought by Albert Guardado, Ryan Maifield,

Matt Ganske and Richard Lake. Jerry Walker came from nowhere to claim second, but this lasted only for a moment as he ran into some trouble going through one of the corners. Guardado now had a strong hold on second, while Maifield and Lake sorted things out for third. As the final seconds clicked away, Babcock had lapped most of the field and crossed the line after the buzzer to claim his first-place victory. Guardado ended up in the second spot, while Maifield held it together to claim third.

- **Expert Truck.** Top qualifier Joey Stanovich suffered a DNS in the Main after his car died at the starting line. This left Justin Morrison, Nick Lasley and Brandon Rowland to battle it out for the championship; and battle it out they did. Morrison ended up on top at the end of the 4-minute Main, but his win didn't come easily. Lasley challenged him throughout the race and crossed the line less than 1 second behind the leader. Rowland secured third and was the only other driver beside Morrison and Lasley to achieve 12 laps.

### MODIFIED A-MAINS

#### Truck

- **A1.** Top qualifier Brian Kinwald shot out in front with Sohrab Tavakoli and Billy Easton in tow. After the first two laps, Kinwald pulled away from the pack, and a three-way battle



Left: Donnie Hughley's silver cup-winning concours entry. Bottom left: Ryan Maifield's second-place concours entry. Love that Cactus Classic paint theme. Bottom right: Sean Baker's third-place concours entry.



## A CACTUS CONCOURS

At a special concours event before the Mains, the first-place finisher was given the R/C Car Action silver cup. Many drivers competed, but only one would walk away with the cup. Donnie Hughley was the unanimous winner with his Rug Rat paint job. Look inside the cab and you'll see that the driver has plenty of snacks and cool sodas. Ryan Maifield (or Flyin' Ryan) was the runner-up with his cool-looking Team Losi Double-XT Graphite Plus 'CR' with the Cactus Classic theme. Sean Baker's Losi Double-XT 'CR' with the green, yellow and white scallop paint job took third.

## CACTUS CLASSIC

for second commenced among Tavakoli, Easton and Jim Gard. Around the halfway mark, Gard moved up to secure second, leaving Tavakoli, Easton and Brent White behind to sort out the third and fourth

positions. With less than 30 seconds left in the Main, Gard started to reel in Kinwald, who had led the entire race. Kinwald kept his cool, though, and crossed the line more than a second sooner than Gard to take the win. Naturally, Gard claimed second, while Tavakoli won the battle for third.

• A2. A pileup at the end of the long, back straight shuffled up the starting order, but Associated's Jim Gard took the lead with his red-hot T3 while Brian Kinwald, Sohrab Tavakoli and Alex Guerrero formed a line behind him. With about a minute down, Kinwald bagged a pipe and rolled over long

### 4WD Modified

POS.	QUAL	DRIVER	CHASSIS	MOTOR	BATTERY	ESC	RADIO	TIRES (F/R)	TRACTION ADDITIVE	PINION/SPUR
1	1	Sohrab Tavakoli	Losi	Maxtec	Maxtech	Novak	Airtronics	Losi	None	84/18
2	3	Brent Thielke	Losi	Race Prep	Pro-Match	Novak	Airtronics	Losi	Team Speed	84/19
3	5	Billy Caley	Losi	Race Prep	Pro-Match	Novak	Airtronics	Losi	None	80/28
4	6	Brian Kinwald	Losi	Trinity	Trinity	Novak	Airtronics	Losi	None	86/18
5	2	Rick Hohwart	Losi	Peak	Team Orion	Novak	Futaba	Losi	None	84/18
6	9	Jimmy Babcock	Losi	Peak	Team Orion	LRP	Airtronics	Losi	None	84/18
7	10	Jason Schweitzer	Losi	Peak	Team Orion	Novak	Airtronics	Losi	None	84/17
8	4	Alex Guerrero	Losi	Peak	Team Orion	Novak	Airtronics	Losi	None	NA
9	7	Ryan Maifield	Losi	Peak	Team Orion	Tekin	Airtronics	Losi	None	88/19
10	8	Jerry Walter	Losi	Race Prep	Pro-Match	LRP	Airtronics	Losi	Pantera	84/19

### 2WD Stock

1	1	Cory Levers	Losi	Trinity	Pro-Match	Tekin	Airtronics	Losi	None	84/22
2	3	Wayne Ashmore	Losi	NA	Team Orion	Novak	Airtronics	Losi	None	84/23
3	4	Rod Swaney	NA	NA	NA	NA	NA	NA	NA	NA
4	5	Kevin Yates	Losi	Trinity	Team Orion	LRP	Airtronics	Losi	None	86/23
5	8	Efren Saenz	Losi	Peak	Team Orion	Tekin	Airtronics	Losi/Pro-Line	None	87/22
6	10	Maurice Contoleon	Assoc.	Peak	Ballistic	Tekin	Airtronics	Losi	None	81/23
7	9	Don Rogney	NA	NA	NA	NA	NA	NA	NA	NA
8	2	Roman Gastelum	Losi	Peak	Trinity	Novak	Airtronics	Losi	None	84/22
9	6	Fred Baumgartner	Assoc.	Fantom	Team Orion	Novak	KO Propo	Pro-Line	None	84/26
10	7	David Paul	Losi	Trinity	Team Orion	Tekin	Futaba	Losi	NA	84/24

### Stock Truck

1	1	Jonah Gallant	Losi	Birdman	Team Orion	Tekin	Airtronics	Losi/Pro-Line	None	88/21
2	3	Scott Flockhart	Assoc.	Peak	Team Orion	Tekin	Airtronics	Pro-Line/Losi	None	85/22
3	5	Dave Anderson	NA	NA	NA	NA	NA	NA	NA	NA
4	7	Joe Pillars	Losi	Fantom	Perfect Match	Novak	Futaba	Losi/Pro-Line	None	88/21
5	8	Joe Lizotte	Assoc.	Peak	Team Orion	Tekin	Airtronics	Pro-Line	None	84/21
6	9	Earl Valles	Assoc.	Peak	Team Orion	Novak	Airtronics	Pro-Line	None	87/22
7	6	Justin Sellers	Losi	Fantom	Trinity	Novak	Airtronics	Pro-Line/Losi	None	88/22
8	2	Efren Saenz	Losi	Peak	Team Orion	Tekin	Airtronics	Pro-Line	None	84/22
9	10	Jimmy Red	Losi	Pro-Match	Pro-Match	Tekin	Airtronics	Pro-Line	None	88/21
10	4	Regan Glendinning	Losi	Birdman	Team Orion	Tekin	KO Propo	Losi	None	87/21

# WE'VE PUT THE STA



When you're ready to fire up your on-road gas racer, fire up your computer first. Log onto the Team Serpent Network web site and check out our ever-expanding gas track directory, complete U.S. and world-wide racing calendars, track photos, contact numbers, maps and much more – total info for all the on-road nitro action in your area and beyond. Start your modem. Then, gentleman, start your engine.

**Expert Stock Truck**

POS.	QUAL	DRIVER	CHASSIS	MOTOR	BATTERY	ESC	RADIO	TIRES (F/R)	TRACTION ADDITIVE	PINION/SPUR
1	3	Justin Morrison	Losi	Peak	Pro-Match	Tekin	Airtronics	Losi	None	88/22
2	6	Nick Lasley	Losi	NA	Trinity	Tekin	Airtronics	Losi	None	88/22
3	4	Brandon Rowland	Assoc.	Reedy	Reedy	LRP	Airtronics	Pro-Line	None	87/22
4	7	Brian Bosley	Assoc.	Reedy	World Class	Novak	JR	Pro-Line/Losi	None	87/21
5	10	Jacob Thome	Losi	Peak	Team Orion	Tekin	Airtronics	Losi	None	88/22
6	2	Richard Trujillo	Losi	Peak	Team Orion	Novak	Airtronics	Losi	None	88/22
7	5	Mike Friery	Losi	Race Prep	Team Orion	LRP	Airtronics	Losi	None	88/24
8	9	Ben Aromin	Losi	Maxtech	Maxtech	Novak	Airtronics	Losi	NA	87/20
9	8	Pete Norman	Losi	Peak	Team Orion	Novak	Airtronics	Losi	None	87/22
DNS	1	Joey Stanovich	Losi	Peak	Ballistic	Novak	Airtronics	Losi	None	87/21

**2WD Expert Stock**

1	1	Jimmy Babcock	Losi	Peak	Team Orion	LRP	Airtronics	Losi	None	84/23
2	2	Albert Guardado	NA	NA	NA	NA	NA	NA	NA	NA
3	6	Ryan Maifield	Losi	Peak	Team Orion	Tekin	Airtronics	Losi	None	87/23
4	5	Chris Koetsch	Assoc.	Quarterflash	Team Orion	Novak	Airtronics	Losi/Pro-Line	None	84/24
5	10	Richard Lake	Losi	Peak	Trinity	LRP	Futaba	Losi	None	86/24
6	7	Jacob Thome	Losi	Peak	Team Orion	Tekin	Airtronics	Losi	None	84/22
7	9	David Goss	Losi	Bennett	Pro-Match	LRP	Airtronics	Losi	None	84/23
8	3	Jerry Walter	Losi	Race Prep	Pro-Match	LRP	Airtronics	Losi	Pantera	84/24
9	4	Matt Ganske	Assoc.	Peak	Team Orion	Tekin	KO Propo	Pro-Line	None	84/24
10	8	Joey Stanovich	Losi	Peak	Ballistic	Novak	Airtronics	Pro-Line/Losi	None	84/24

**Mod Truck**

1	1	Brian Kinwald	Losi	Trinity	Trinity	Novak	Airtronics	Losi	None	88/19
2	2	Jim Gard	Assoc.	Peak	Pro-Match	LRP	Airtronics	Pro-Line	None	87/18
3	3	Sohrab Tavakoli	Losi	Maxtec	Maxtec	Novak	Airtronics	Losi	None	88/20
4	4	Billy Easton	Assoc.	Reedy	Reedy	LRP	Futaba	Pro-Line	None	87/18
5	6	Brent White	Losi	Reedy	Reedy	LRP	Airtronics	Losi	None	88/19
6	9	Derek Furutani	Assoc.	Maxtec	Maxtec	LRP	Airtronics	Pro-Line	None	87/17
7	8	Alex Guerrero	Losi	Peak	Team Orion	Novak	Airtronics	NA	None	NA
8	5	Lloyd Dassonville	Assoc.	Reedy	Reedy	LRP	Airtronics	Pro-Line	None	87/17
9	10	Ryan Maifield	Losi	Peak	Team Orion	Tekin	Airtronics	Losi	None	88/19
10	7	Shawn Dassonville	Assoc.	Reedy	Reedy	LRP	Airtronics	Pro-Line	None	87/17

**2WD Modified**

1	2	Scott Hughes	Assoc.	Reedy	Reedy/Orion	LRP	KO Propo	Pro-Line	None	81/19
2	1	Jim Gard	Assoc.	Peak	Pro-Match	LRP	Airtronics	Pro-Line	None	81/21
3	3	Brian Kinwald	Losi	Trinity	Trinity	Novak	Airtronics	Losi	None	84/20
4	5	Matt Francis	Losi	Trinity	Trinity	LRP	Airtronics	Losi	None	84/21
5	9	Jason Schweitzer	Losi	Peak	Team Orion	Novak	Airtronics	Losi	None	84/22
6	10	Brent Thielke	Losi	Race Prep	Pro-Match	Novak	Airtronics	Losi	Team Speed	84/23
7	4	Sohrab Tavakoli	Losi	Maxtec	Maxtec	Novak	Airtronics	Losi	None	84/22
8	6	Brent White	Assoc.	Reedy	Reedy	LRP	Airtronics	Losi/Proline	None	81/20
9	7	Rick Hohwart	Losi	Peak	Team Orion	Novak	Futaba	Losi	None	84/21
10	8	Lloyd Dassonville	Assoc.	Reedy	Reedy	LRP	Airtronics	Pro-Line	None	84/20

# TING LINE, ON-LINE.



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EXCITEMENT IN THE FAST LANE

enough to let Guerrero take the second spot, Tavakoli moved down to third and Kinwald found himself in fourth. Coming off the last jump, Gard got tangled up with Guerrero but managed to regain the lead. Meanwhile, Kinwald got past Tavakoli and set his sights on the leaders. At the sound of the buzzer, Gard and Kinwald were the only two drivers to go the extra lap, so although the race was over for the rest of the field, the battle between Gard and Kinwald continued. These two drivers put on an amazing performance, and this time it was Gard who emerged victorious by crossing the line less than a second in front of Kinwald. Alex Guerrero was third.

• **A3.** Brian Kinwald and Jim Gard were tied going into the third and final Main, so the race was very much up for grabs. Both drivers were aware of their point standings and raced as if their lives depended on the win. Meanwhile, Billy Easton and Sohrab Tavakoli had their own little war for third and fourth. At around the halfway mark, Kinwald started to make some room between his challenger, Gard, and soon had a commanding lead. Kinwald continued to stretch his lead until it became evident that there was no catching the runaway Dirtinator. Kinwald was the only driver to post 13 laps, and he easily won the race and the championship. Jim Gard received a well-deserved second place for his fantastic performance, and third-place finisher Tavakoli deserved a pat on the back for his efforts as well.

#### 4WD

• **A1.** The action began at the sound of the starting tone and never let up until the very end. Top qualifiers Sohrab Tavakoli and Alex Guerrero battled it out for first and second, while Jerry Walter and Brent Thielke (and just about everyone else) battled for third and fourth. At around halfway, things changed significantly: Thielke moved up, Guerrero fell back a position or two, and Kinwald made his way in through the back door. Soon, Tavakoli had Thielke and Kinwald breathing down his neck, but he managed to cross the line—not a second too soon—to take the win. Thielke crossed moments later to claim second, while Kinwald settled the score and secured third.

• **A2.** Sohrab Tavakoli, Alex Guerrero and Brent Thielke all managed to avoid a pileup in the first corner and formed a line in that order. With less than a minute down, Guerrero rolled his car over, and that allowed Thielke to claim second. Tavakoli and Thielke fought for the remainder of the race, much to the crowd's delight. Billy Caley had the third position pretty much sewn up, while Brian Kinwald and Rick Hohwart raced for the third and fourth spots. Tavakoli and Thielke swapped posi-



**Scottsdale R/C Speedway shop manager Scott Anfinson called the race and offered some witty commentary.**



**Peak company owner Rick Hohwart wrenches on his ride before one of the triple A-mains.**



**Above: Brian Kinwald and Sohrab Tavakoli talk shop. Brian won Mod Truck, while Sohrab cleaned up in 4WD Mod. Right: Hitec's Mike Mayberry cruises through tech row.**



**Left: Jimmy Babcock is cool and collected on the drivers' stand. Right: Lloyd Dassonville traveled all the way from Northern California to attend the Cactus Classic. The long journey paid off because he qualified in both the 2WD Mod and Truck Mod A-mains.**



tions a couple of times, but it was Thielke who came up on top in this battle. Tavakoli had to settle for second after losing the race on the last corner, while Caley seemed quite content with third.

• **A3.** Sohrab Tavakoli and Brent Thielke were tied with 199 points each as they entered the third and final Main, so it was winner take all. The two racers put on another amazing performance by trading positions several times. It was Rick Hohwart and Alex Guerrero, however, who led for a good part of the race before they finally backed down to let Tavakoli and Thielke continue the rivalry. From that point on, there was no challenging the leading cars as they bumped and rubbed each other the entire way. Tavakoli managed to cross the line less than a second ahead of Thielke to claim the win and the championship. Gard took home a second-place trophy for his efforts, while Billy Caley finished third.

#### 2WD Modified

• **A1.** Brian Kinwald's Double-X 'CR' stormed to the front with Jim Gard, and Scott Hughes followed dangerously close behind. Just after the 1-minute mark, Kinwald's Double-X hit a pipe and ended up on its lid long enough for Gard to sneak by to take the lead. Thanks to some rather quick turn marshalling, Kinwald lost only one position but ended up in a little cluster with Hughes, Jason Schweitzer and Rick Hohwart. With the clock counting down the final minute, Kinwald closed the gap between himself and the leader and was soon riding on Gard's tailgate. Gard made a slight error going through one of the last corners, and Kinwald quickly seized the opportunity. Kinwald was the only driver to cross the line before the buzzer, and that allowed him to turn an additional lap. Gard had to settle for second, while Schweitzer won the battle for third.

*(Continued on page 182)*



# Tamiya TGX Mk.1



# SUPER NITRO TOUR

by George M. Gonzalez

MANY CONSIDER the Tamiya\* 1/8-scale TGX Mk.1 and Kyosho\* Super Ten GP—a vehicle of similar size—to be Japan's grandest nitro-powered touring/GT1-style R/C cars (and they're possibly the most expensive). Though they're very popular in the Land of the Rising Sun, these large-scale vehicles aren't quite as common here in the States—mainly because there isn't an organized racing program for vehicles of this type. But any R/C racing enthusiast will appreciate their long list of racing features and innovative chassis designs.





# RER SHOOTOUT

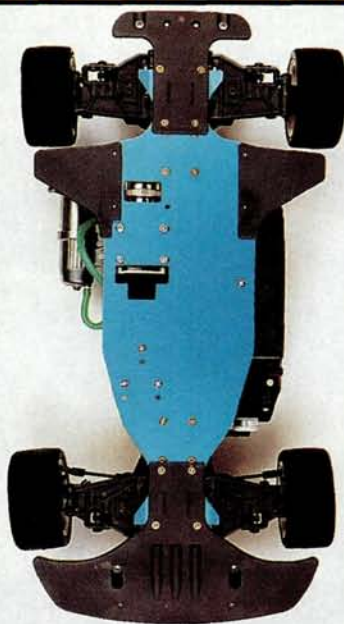
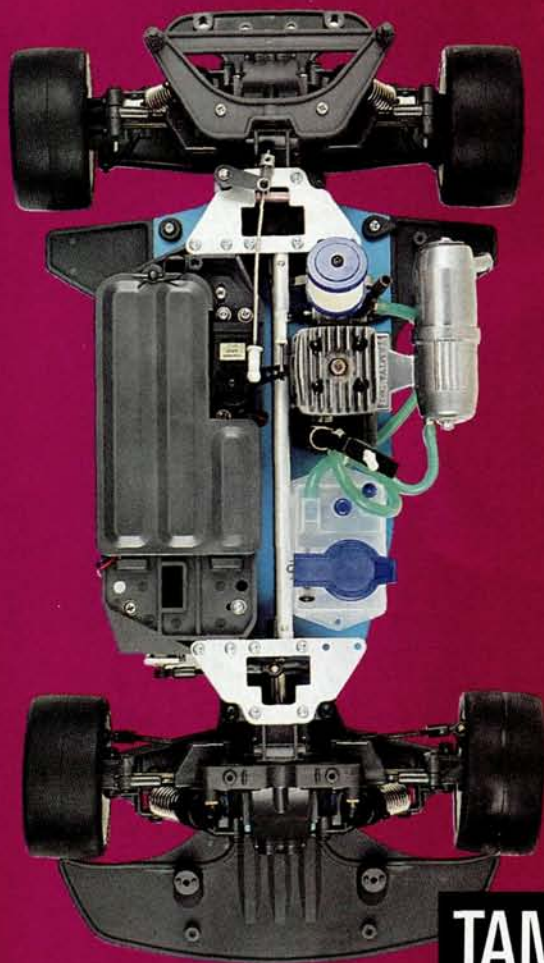
*Although the cars have similar features, they're actually two different animals that require completely different methods of taming. We decided to order up a couple of these state-of-the-art super tourers and run them side by side to compare notes.*

*After we had compiled all the data, we took them back to our workshop and modified them with options offered by their manufacturers. Then we evaluated their performance for a second time.*

*Now, after many hours of racing and testing, it's time to reveal our findings. If you're wondering which took top honors among the R/C Car Action editorial staff, read on to find out.*



## Kyosho Super Ten GP

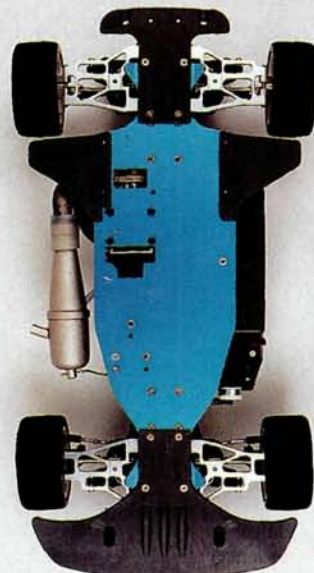


Left: overhead view of stock TGX shows its straightforward chassis. The OPS .15 engine is mounted inline on the left side; sealed radio box is on the right; 80cc fuel tank is slightly bigger than the Super Ten's. Above: the flip side—the thick, blue-anodized-aluminum chassis; no need for upgrading here.

## TAMIYA TGX MK 1



Above left: the front end may look basic, but it's feature filled. Camber, toe-in/out, roll center and chassis droop can all be adjusted. Above right: the rear end has the same features as the front. Remove a few screws and the diff is in your hand. Love that rear bumper. Right: top and bottom of our totally hopped up TGX. The heat-sink head and tuned pipe really boost OPS engine performance. The flip side reveals the aluminum-alloy front and rear suspension arms, countersunk screw holes and reinforced slicks in Tamiya's soft, M2 compound—a potent performer.



SCALE 1/8  
LIST PRICE \$578  
Available at \$399

**DIMENSIONS**  
Length (chassis) 17.75 in.  
Wheelbase 11.75 in.  
Width (F/R) 8 9/16 in.

**WEIGHT**  
Chassis only (RTR) 4 lb., 10.5 oz.

**CHASSIS**  
Type Flat plate with upper strengthening beam  
Material Aluminum

**SUSPENSION (F/R)**  
Type Lower suspension arm w/adjustable upper wishbones  
Damping Oil-filled coil-over shocks  
Shock towers Molded plastic

**STEERING SYSTEM**  
Type Twin bellcranks with center drag link  
Tie rods Threaded rods  
Servo-saver High-torque servo-saver included

**DRIVE SYSTEM**  
Type Shaft-drive 4WD  
Primary Clutch bell/spur gear  
Power transfer Dogbones/drive axles  
Differentials (F/R) Bevel gear  
Bearings/bushings Bearings/bushings

**BRAKE SYSTEM**  
Type Single disk brake  
Disk brake material Fiberglass  
Brake pad material Metal

**WHEELS**  
Type One-piece plastic  
Dimensions 2 3/16 x 1 3/16 in.

**TIRES (F/R)**  
Type Rubber slicks or treads depending on model

**ENGINE**  
Type Tamiya/OPS VR-15S side-exhaust glow engine with pull-start  
Carburetor Barrel carb w/high-end needle-valve adjustment  
Exhaust system Model-airplane-type muffler  
Air filter Single element (foam)  
Fuel-tank capacity 80cc

### AVAILABLE OPTIONS

Specifically for TGX	
—turnbuckle set	53197*
—universal shaft set	53198*
—stabilizer set (2)	53199*
—shaped tire inserts (x2)	53203*
—2-speed transmission	53201*
—finned-aluminum engine mounts	53242
—stainless-steel hinge-pin set	53207*
—carbon propeller shaft	53244*
—ball-diff set (x2)	53245*
—rear aluminum upright set	53252*
—progressive force spring set	53281
—aluminum front suspension arms	53289*
—aluminum rear suspension arms	53290*
FS-15 oversize heat-sink head	41009*
TM-2 vertical U-shaped header	41028*
TM-2 race tuned pipe	41022*
Aluminum air-cleaner mount	41019*
VR-15S Slide carburetor	41025
4WD front one-way unit	53200
M-Grip Super Slicks (x2)	53202*
Lightweight flywheel	53208*
Wheel axle bearing set	53196*

\* used on our "Shootout" car.

**SCALE** Super Ten  
**LIST PRICE** \$499.99  
**Available at** \$379.99

**DIMENSIONS**  
**Length (chassis)** 16.75 in.  
**Wheelbase** 11 in.  
**Width (F/R)** 8 5/8 in.

**WEIGHT**  
**Chassis only, RTR** 4 lb., 8.8 oz.

**CHASSIS**  
**Type** Upper and lower plate  
**Material** Aluminum

**SUSPENSION (F/R)**  
**Type** Lower suspension arm with upper wishbone/upper and lower suspension arms  
**Damping** Coil-over, oil-filled shocks  
**Shock towers** Molded

**STEERING SYSTEM**  
**Type** Twin bellcranks with center drag link  
**Tie rods** Included  
**Servo saver** Included

**DRIVE SYSTEM**  
**Type** Shaft drive 4WD  
**Primary** Clutch bell/spur gear  
**Power transfer** Dogbones/drive axles  
**Differentials (F/R)** Bevel gear  
**Bearings/bushings** Eight bearings/eight metal bushings

**BRAKE SYSTEM**  
**Type** Single disk brake  
**Disk-brake material** Stainless steel  
**Brake-pad material** Stainless steel

**WHEELS (F/R)**  
**Type** One-piece plastic  
**Dimensions** 2.25x1.35/2.25x1.59 in.

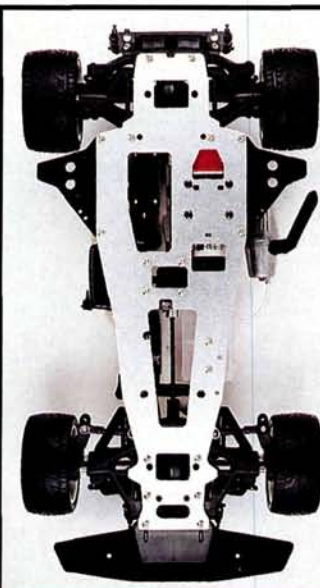
**TIRES**  
**Front/rear** Low-profile street treads

**ENGINE**  
**Type** Kyosho GT-15 side-exhaust glow engine with pull-start  
**Carburetor** Barrel-type with high and low needle-valve adjustments  
**Exhaust** Airplane-type muffler  
**Air filter** Tinsel element (foam)  
**Fuel tank capacity** 75cc

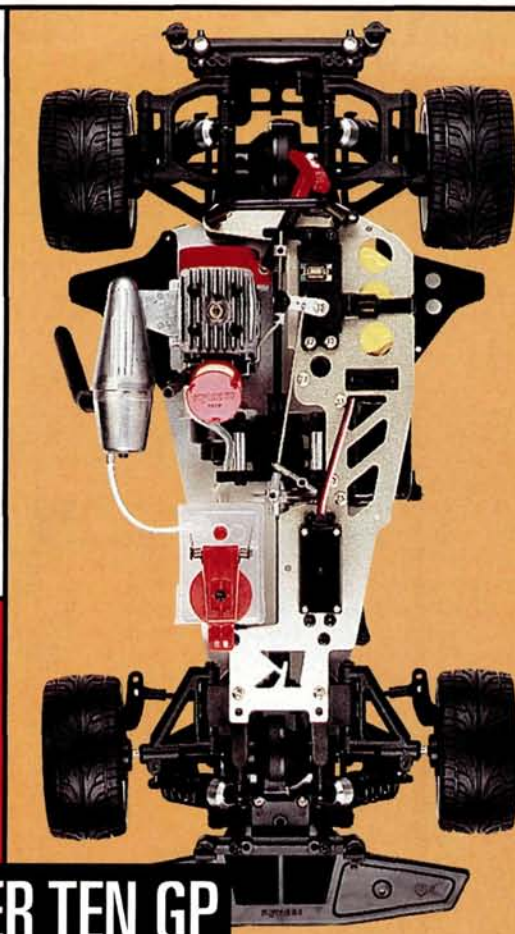
#### AVAILABLE OPTIONS

Wide suspension arms (F/R)	FZW-2 /FZW-3
Carbon upper deck	FZW-5*
Main chassis	FZW-4*
Special universal-swing shafts	FZW-6*
Rear stabilizer set	FZW-7
Titanium suspension shafts (A/B/C)	FZW-10/ FZW-11/FZW-12*
High-ratio hard spur gear (39-teeth)	FZW-14
Tower bar set	FZW-16*
ATC rear suspension set	FZW-17*
Aluminum steering arm	FZW-21*
Carbon steering plate	FZW-22*
2-speed transmission	39666*
Super Ten tuned exhaust	39517*
Fuel filter	39308*
Super Ten ball diff set (2)	39507*
High-ratio ring-gear set	39508
Cooling-fan set	39641*
Zero 30z slick tires (F/R)	92683-30/ 92684-30*
Front one-way unit	W5-111
Center one-way unit	39311
Special disk brake	BSW-52*
Teflon touring shocks (F/R x2)	W-5152/W-5153*
Urethane front bumper	39401*
Special roll bar	SPW-53
Special antenna holder	1710*
Vespal clutch shoe	39671*
Special uni-crank	39655*
Two ball-bearing sets (12x18/5x8mm)	96592/1902*
Quick-release body-mount set	39502*
Heat-sink engine mount	39648*

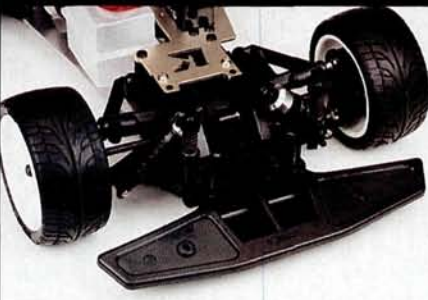
\* Used on our "Shootout" car



Above and right: trick-looking stock Super Ten; GT-15 engine is mounted in line, but is on the right side. Too bad the screw holes are not countersunk. Below left and right: Caster, camber, chassis droop and width are all adjustable up front, and a front swaybar is included. The rear end is also highly adjustable, and roll center can be altered slightly.



## KYOSHO SUPER TEN GP



Right: here's our hopped-up Super Ten. I'm sure you'll agree that it's a beauty. The tuned pipe helps the engine breathe much better, and the small fan in front of the engine does a fantastic job of keeping it cool. The foam front bumper is a must because it gives the body and chassis great crash protection. The shot of the flip side reveals the optional chassis; it's thick yet light, thanks to all the material that was removed during the milling process.



## TAMIYA TGX MK 1

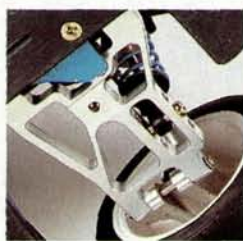
In this editor's opinion, the TGX represents Tamiya at its finest and is the company's most tunable racecar. It's very popular in Japan and is mostly raced by an elite group of Tamiya enthusiasts at Tamiya's sanctioned events.

The TGX is based on a shaft-driven 4WD drive train with an in-line-mounted OPS\*.15 pull-start engine that was specially made to Tamiya's exacting standards. The engine is mounted on the left side of the chassis on adjustable engine mounts, and the clutch bell mates with a plastic spur gear that's just in front of the rear gearbox. A single, hardened-steel propeller shaft links the gearboxes and provides continuous 4WD power.

The thick, blue-anodized-aluminum chassis with countersunk screw holes is reinforced by an aluminum center beam that's attached to the front and rear bulkheads.

The car's excellent handling traits are attributed to its completely independent suspension that comprises lower suspension arms with adjustable upper wishbones. The upper wishbones allow easy camber adjustment, and the lower suspension arms feature threaded setscrews that allow the tuner to adjust chassis droop (suspension-arm down-travel).

All four corners have plastic-body, oil-filled shocks that feature hardened, stainless-steel



**Here's the optional Tamiya alloy suspension arms and rear axle carriers. Note the lip on the chassis; it serves as a stopper for a setscrew in the suspension arm.**

**The setscrew is used to adjust ride height.**

shock shafts, double O-ring seals, interchangeable pistons and rubber bladders. In traditional Tamiya fashion, the front and rear gearboxes are virtually identical and allow easy access to the



**We love the TGX radio box; there's no way fuel or dirt can enter, and there's lots of room for the radio system.**

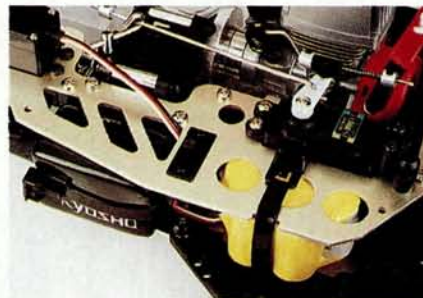
maintenance-free bevel-gear differentials.

The chassis layout was designed to facilitate tuning and maintenance, and all the major components may be removed quickly and easily, leaving the drive train and disk-brake mechanism unobstructed.

The car's most notable features have to be its extra-large, 80cc fuel tank and completely sealed radio box with integral steering- and throttle-servo mounts. Remove five screws, and the radio box—with servos and antenna attached—is in your hand. The TGX is supported by a long list of high-performance factory tuning parts, and the many available body styles allow racers to customize to their hearts' delight.

## KYOSHO SUPER TEN GP

The Super Ten isn't actually 1/8 scale. According to Kyosho, it has a similar wheelbase and track to those of a 1/10-scale, rear-exhaust .15, nitro-powered on-road car, such as the Serpent M2 and Mugen Seiki Avance—hence the name "Super Ten." Its suspension is similar to those of the formidable Serpent and Mugen, but it has been adapted for side-exhaust .15, scale touring car and GT1 racing. Even though it isn't 1/8 scale, it's very close in touring car standards anyway—especially if you compare Super Ten body shells with those designed to fit the 1/8-scale Tamiya TGX; their overall lengths and widths are within a fraction of an inch of being identical. If you break out the tape measure and measure these chassis, however, you'll find that the Tamiya TGX has a slightly longer wheelbase.



**Above left: the Super Ten radio tray is a little more compact, so careful radio gear installation is required. Removing the radio tray from the car is also a little more involved than on the TGX. Above right: the graphite radio tray on our hopped up Super Ten is far more high tech looking, but doesn't have any more room and is no easier to remove than the stock unit. See the 2-speed tranny just behind the fuel tank?**

The Super Ten was designed by a team of hardcore racers, and in Japan, it's more popular than the TGX. For this reason, it's generally more accepted by racers who participate in higher levels of competition. If you're fortunate enough to get your hands on Japanese R/C publications such as *R/C World* and *RC Magazine*, you'll see that hardly an issue goes by that doesn't have a tech article on it. Kyosho offers an extensive array of factory options, and the car is also supported by a ton of aftermarket companies. These allow it to be transformed into an exotic "supercar" that would make any gearhead drool like a St. Bernard after drinking from its favorite water hole.

The Super Ten's shaft-drive 4WD system provides continuous power to all four wheels. The included Kyosho GT-15 pull-start engine is mounted in-line on the right side of the chassis, and the clutch bell mates with a plastic spur gear that's dead center on the chassis along with the disk-brake mechanism. Dogbones link

the two gearboxes, and you'll find identical, maintenance-free, bevel-gear differentials inside the scale-looking gearboxes.

A relatively conventional, double-deck aluminum chassis provides an ultra-rigid foundation, but unlike those on the Tamiya TGX, the lower chassis screw holes are not countersunk. The Super Ten's chassis layout was designed to facilitate tuning and maintenance, but the task is a little more involved than on the TGX. A 75cc fuel tank provides decent run times, and the throttle and brake linkages are very straightforward.

The Super Ten has excellent road handling thanks to its fully independent suspension. Up front, upper and lower wishbones pivot on extra-thick hinge pins, and the steering blocks are attached to the upper and lower wishbones



**Kyosho's active toe control (ATC) adjusts the toe angle of each rear wheel, increasing toe-in as the suspension is compressed.**

with 11mm adjustable pillow balls—à la Serpent technology—that allow subtle camber and front-width adjustments. Caster may also be adjusted by sliding the upper wishbone forward or backward on the hinge pin. Clip-on spacers allow two front-caster possibilities. A front swaybar helps cope with high-speed cornering, and all four suspension arms have threaded setscrews that allow chassis-droop adjustment.

In the rear, upper and lower A-arms pivot on extra-beefy hinge pins, and 11mm pillow balls make trackside camber adjustment a snap. The Super Ten's plastic-body, oil-filled shocks feature aluminum caps, double O-ring seals, stainless-steel shock shafts and clip-on preload spacers. Kyosho offers many body choices, so if you're into touring-car or GT1 racing, you'll find the one you need to make the Super Ten look as good as its performance.

## HOW DO THEY COMPARE?

	KYOSHO SUPER TEN	TAMIYA TGX MK. 1
Wheelbase	11 in.	11.75 in.
Width (F/R)	8 5/8 in.	8 3/16 in.
Weight (stock)	4 lb., 8.8 oz.	4 lb., 10.5 oz.
Weight (modified)	4 lb., 13 oz.	4 lb., 14 oz.
Diff type	Bevel gear	Bevel gear
Chassis	Aluminum	Aluminum
List price	\$499.99	\$578
Available at*	\$379.99	\$399

\*Prices vary

## THE EDITORS' VIEWS

**George:** in my opinion, the Tamiya TGX is easier to assemble and maintain and performs better in both stock and modified forms than the Kyosho Super Ten. Don't get me wrong; I think the Super Ten is awesome, and if money alone were the consideration, I'd probably opt for it because it's considerably cheaper than the TGX. It also looks far more impressive in modified form, but once the bodies go on and you yank on the trigger, the TGX with its OPS .15 engine will feed taillights to the Super Ten all day. Even if both cars had exactly the same powerplants, I still think the TGX would out-perform the Super Ten because of its longer wheelbase, wider track and slightly heavier running weight. You wanted a definitive answer and I gave it to you; now, get off my back, Chris!



**Pete:** I really thought I was going to be Mr. Super Ten. I couldn't resist those big pumpkin diff cases, the pivot-ball steering system, and the trick upper A-arms in the rear with the shocks poking through. Sweet. By contrast, the TGX struck me as a rather pedestrian piece of equipment—just basic R/C tech, scaled up. Yawn. However, after driving both machines, and working on them, I'm a TGX convert. You've heard the saying "A bird in the hand is worth two in the bush"? I've got a twist on that one—a diff in the hand is worth two buried in the car. The TGX is a treat to work on. The diffs can be removed by unscrewing just four screws; the sealed radio box keeps the delicate stuff out of harm's way; and the car's major sub-assemblies are easily dismantled.

The TGX is much easier to live with off the track and just as exciting as the Super Ten on the track. But, George, you're crazy if you think the Super Ten with more engine won't romp on the TGX. Sure, it's smaller, but it still puts down a big footprint. More important, the Super Ten's suspension is much more advanced; those massive upper and lower A-arms along with the torsion-bar front end add up to a much more nimble machine when the limits are pushed, but for convenience and fun, I pick Tamiya.

**Greg:** on the day I first saw the Kyosho Super Ten, I fell in love with it. Its exciting, new, innovative look was the first thing to catch my eye. Large pillow balls are attached to the hubs; shocks are mounted in the center of the arms; the car just looks plain cool! Then I drove it! Impressed doesn't even begin to describe the sensation of barreling down the straights and pitching it sideways through the turns—all under control, of course. I was shaking with a mad rush of adrenaline after the tank of fuel had gone.

Yes, working on it is a little tricky, but this is a serious racer, so a challenge is acceptable. Now G-Man, I don't know what kind of smoke you're blowing out of your tuned pipe, but the last time I checked, a longer car has less steering, and heavier equals slower. I'll give it to you that the TGX is easier to work on and quicker with an OPS engine, but if I were to stick a race engine in my Super Ten, I bet you wouldn't even see my taillights. The stock Kyosho engine was meant only to get you up and running at a low cost. Did you notice the price tag on the TGX? I say Super Ten all the way!



**Chris:** I feel these two vehicles are different animals—the TGX is larger than the Super Ten—so making a direct comparison a somewhat dubious task. Fear not, however; I won't wuss out and give a politician-style answer that will offend the least.

The TGX has a longer wheelbase, a wider track and a superior engine. These hard facts make it faster and make it handle better. I also like the simplicity of services on the part of the Tamiya. That having been said, as a racer, especially in a "spec" class in which everyone runs the same chassis, the Super Ten gets my vote. With its composite suspen-

sion components—versus the molded-resin parts of the TGX—and its highly tunable suspension, the Super Ten is simply more of a racing machine. This is further supported by the fact that far more aftermarket high-performance equipment is available for the Super Ten. I vote Super Ten.



## Editors' Ratings

Category	TAMIYA TGX Mk. 1	KYOSHO Super Ten GP 4WD
Completeness	8	8
Instructions	9	7.5
Parts quality	8	8
Ease of assembly	8	6
Hop-up potential	6.5	8
Maintenance	8.5	7.5
Tunability	6.5	7
Performance	8	7.5
<b>Bang for the buck</b>	<b>4.5</b>	<b>6.5</b>
<b>TOTALS</b>	<b>67</b>	<b>66</b>

## ENGINE COMPARISON

The TGX and Super Ten have adjustable engine mounts that will accommodate most .12 to .15-size engines, but we decided to test the stock and modified versions with the engines that came with the cars—but modified with the high-performance options offered by both manufacturers.

The Tamiya OPS VR-15S is supported by several hop-ups, while the Kyosho GT-15 has only a few optional parts to choose from. The GT-15 engine does have one major tuning advantage over the OPS engine: the carburetor's low- and high-end needle-valve adjustment. The OPS engine has only a single, high-end, adjust-



Tamiya TGX Mk. 1

**Above:** more power and more fuel; that's what you get with the Tamiya engine.

**Below:** more tuning capabilities and less mess are the Kyosho engine's strong points.



Kyosho Super Ten GP

ment, and one of our editors said he felt it loaded up if you let it idle for too long. Having a bottom-end adjustment might have helped this slight tuning ailment. In addition, our OPS leaked more fuel than the GT-15. Most of it leaked out through the front crankshaft bearing, indicating that the bearing is not sealed.

As far as optional parts go, you can add a header and tuned pipe, a heat-sink head, high-performance air filter with aluminum mount, and high-performance slide carburetor with high and low needle-valve adjustment to the OPS. The GT-15 can benefit from the installation of an optional tuned pipe and header and a high-performance air filter. Even though the OPS doesn't include a low-end needle-valve adjustment and leaks more fuel, it's noticeably faster than the GT-15 and seems to run a little cooler.

## HOW WE RATED THEM

### Completeness

Having bought it, how much more do you have to spend to get each vehicle up and running? This does not include the radio gear and glow-plug igniters because these are rarely included with nitro kits. Both cars scored high marks because they were comparably equipped and included many of the tools that are needed for building and operating the vehicles.

■ **Winner—tie**

### Instructions

How well presented are the written instructions and illustrations? Tuning tips and optional-parts lists are a big plus.

The Kyosho Super Ten has great instructions that include step-by-step exploded-view illustrations, but some of the recommended starting adjustments gave the car excessive toe-in or extremely negative camber. The TGX instructions are more straightforward, and the recommended adjustments are dead on. Like all of Tamiya's other R/C kits, the TGX is a pleasure to build.

■ **Winner—TGX**

### Parts quality

Overall quality based on these criteria: tolerances (fit) of molded parts and how much flashing has to be trimmed off; durability; rigidity. Both cars scored high marks here, too, because of their extra-rugged construction.

The TGX parts were easier to trim and had slightly less flashing. Many of the Super Ten's suspension and steering system parts, however, seemed to have a more precise fit that allows them to operate with less slop.

■ **Winner—tie**

### Ease of assembly

How easy was it to put the cars together? How well did the parts fit together, and how well did the instructions help?

The Super Ten is considerably more difficult to build than the TGX because of its suspension's complexity. The TGX is very easy to build and could be successfully assembled and raced by beginners.

■ **Winner—TGX**

### Hop-up potential

Based on the availability of special tuning and performance-enhancing specialty parts offered by both manufacturer and other aftermarket sources.

Kyosho and Tamiya both offer a complete line of high-performance tuning parts. The Super Ten, however, is more widely supported by aftermarket companies.

■ **Winner—Super Ten**

### Maintenance

How easy are the vehicles to maintain?

Both are fairly easy to maintain, but the TGX gets the nod because of its easy-to-remove radio tray. It takes a little more work to strip the Super Ten down to a rolling chassis.

■ **Winner—TGX**

### Tunability

How many tuning options do the stock vehicles have? We didn't consider the availability of special factory tuning parts that increase the tuning choices.

Out of the box, both cars are highly tunable, but the Super Ten offer more possibilities for adjustment, including front caster and width.

■ **Winner—Super Ten**

### Performance

How well did each vehicle perform? Although these evaluations were somewhat subjective, the editors all rated the performance of both vehicles and we averaged their assessments to produce a score.

Both cars scored well, but we all agreed that the TGX was a little faster, both in stock and modified trim, and it was slightly more stable.

■ **Winner—TGX**

### Bang for the buck

How much performance do you get for your money?

These cars are expensive, so no *high* scores were given here, but the TGX is slightly more expensive, so the Super Ten has the edge here.

■ **Winner—Super Ten**



## AVAILABLE BODY SHELLS

### Tamiya TGX

- Porsche 911 GT1 (featured in this article)—part no. 50729
- Kure Nismo GT-R—50725
- Sonax AMG Mercedes C-Class—50560
- Alfa Romeo 155 V6 TI—50561
- Opel Calibra V6 DTM—50562
- Castrol Toyota Supra GT—50666
- Nismo Clarion Skyline GT-RLM—50665
- Calsonic Skyline GTR—50713
- Avex Dome Mugen NSX—50775
- Nissan R390 GT1—50758

### Kyosho Super Ten

- Castrol Supra (featured in this article)—part no. 39532
- Calsonic Skyline—3953
- McLaren F1—39535
- STP Porsche—39621
- Mercedes CLK-GTR—39743
- Porsche 911 GT1—31602GT

## TUNING ADJUSTMENTS

### Adjustable

- front toe
- rear toe
- camber (F/R)
- caster
- anti-squat
- wheelbase
- width (F/R)
- roll center
- chassis droop (F/R)
- brake bias
- engine mounts

### Swaybar (F/R)

### Torque splitter/one-way

### No. of inner camber-rod positions (F/R)

### No. of outer camber-rod positions (F/R)

### No. of upper shock mounting positions (F/R)

### No. of lower shock-mounting positions (F/R)

\* With optional pivot block

\*\* Optional F/R swaybars

\*\*\* With optional one-way

### Tamiya TGX Mk. 1

yes  
no  
yes/yes  
no  
no  
no  
no/no  
yes/yes  
yes/yes  
no  
yes  
yes/yes \*\*  
yes \*\*\*  
2/2  
1/1  
1/1  
2/3

### Kyosho Super Ten GP 4WD

yes  
yes \*  
yes/yes  
yes  
no  
no  
yes/no  
no/yes  
yes/yes  
no  
yes  
yes/no  
yes\*\*\*  
1/1  
1/2  
1/1  
2/1

## WRAPPING IT UP

We enjoyed testing and racing these vehicles, but that isn't why we did it. We hope that you get as much out of it as we did. The *R/C Car Action* editors agreed that the Tamiya TGX Mk.1 and Kyosho Super Ten GP are highly competitive and highly enjoyable—truly a pleasure to own.

As you can see by the scores, given that we could hardly agree on anything, it was tough to decide on a victor. In the end, though, the TGX slightly edged out the Super Ten, but that shouldn't sway your purchasing decisions. Each car has its particular unique advantages, and one may be better suited to you. I think you'll agree that both cars are winners and that either would make you the envy of all your friends.

\*Addresses are listed alphabetically in the Index of Manufacturers on page 217. ■

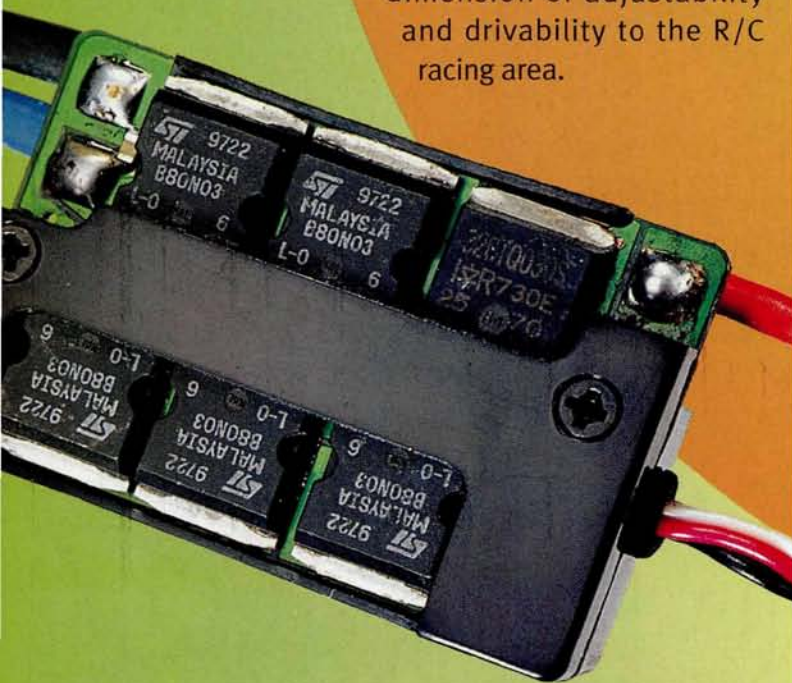
# FIRST LOOK!



# Tekin G-10 ESC

by Steve Pond

ESCS AND R/C electronics as a whole have seen phenomenal growth and technological development—much like that of personal computers. As a matter of fact, much of today's cutting-edge R/C equipment is computer-enhanced or -controlled! Controllers now have a battery of unique features that add an entirely new dimension of adjustability and drivability to the R/C racing area.



Tekin Electronics\*, one of the most respected manufacturers of R/C electronic equipment, has launched the latest salvo in the battle for ESC technological supremacy with its newest model, the computerized G-10 Pro.

With the G-10, Tekin takes a different approach to programmable adjustment. The ESC is self-contained, inasmuch as it doesn't require a separate unit for programming; you change the G-10's adjustable operating parameters with the buttons built into the top of its case. It appears to be somewhat less adjustable than ESCs with separate programming units, but that makes it an excellent choice for those who seek a simpler, more economical approach to higher performance. It's also a plus for absent-minded enthusiasts who might lose a remote programming unit!

## FEATURES

- **QuickTune Pro digital setup**—a one-touch setup feature that synchronizes the G-10 with the radio system in about 10 seconds.
- **Brake minimum (BMIN)**—controls initial braking power; for example, on a high-bite track, you might want the brakes to come on more strongly than on a low-bite track.
- **Drag brake (B DRG)**—a trick used by some top-level drivers; provides a little braking when the throttle is at neutral. This instantly transfers weight to the front of the car and results in a quicker transition from throttle to brake. This allows you to brake later and gives better steering response when entering a turn.
- **Neutral (NTRL)**—adjusts the amount of trigger throw required to activate the throttle or brake. Lower values reduce the trigger's neutral area, and larger values increase it. In addition to altering the perceived

responsiveness of the throttle, this setting is also very useful for radio systems that have difficulty maintaining neutral, e.g., there are frequent "blips" of throttle when the car is supposed to be sitting still.

- **Throttle curve (THRTL)**—modifies how the ESC responds to throttle input from the radio. At the lower settings, its response is linear: half-throttle position on the transmitter equals 50 percent power output from the ESC. At higher throttle-curve settings, power output isn't proportional; for example, half throttle may now result in 75 percent power output from the ESC. This is ideal where quick throttle response and more finite control at higher speeds are required.

- **Current limiter 1 (LIM 1)**—the first stage of the G-10's double current-limiter system. LIM 1 is the current limiter that is active for the first 3 seconds once full throttle has been reached. This can be very effective on slippery tracks where flat-out horsepower causes excessive wheelspin.

- **Current limiter 2 (LIM 2)**—takes over after the 3-second timer has expired for LIM 1. The combination of the two current limiters can be particularly effective for paved-oval racing in which very little current/power can initially be applied because of the lack of traction off the starting line (lower setting required for LIM 1). After leaving the starting line, however, unlimited current is needed to keep the car at full speed (higher setting on LIM 2). And it's also good when racing on high-bite, off-road tracks on which boundless current delivery is desirable for a good jump off the starting line. After the start, LIM 2 kicks in and can limit the current to conserve motor life and battery power.

In addition to its technical features, the G-10 has other

features worth noting. The G-10's design is unconventional in that no transistor tabs protrude from the top of the case. Instead, the transistors are mounted flat in the bottom of the case, and they are missing the heat-sink tabs that we're used to seeing. This is very easy to see because the bottom of the ESC's case is open around the area of the transistors! The benefits of this design are a lower center of gravity and open airflow around the transistors for cooler operating temperatures. However, the case's open design looks as though it might allow moisture to get inside and cause a problem (conventional speed controls are not immune to this, either). The smaller surface area of the case bottom makes it harder to secure the G-10 firmly on a chassis; to hold it firmly in place, use a zip-tie and servo tape.

Champion driver Mike Blackstock told us that he used Shoe-Goo to secure a G-10 in his 4-cell car; more on Mike and his G-10 later in this article.

### "WATTS" IT ALL MEAN?

The G-10 appears to be a well-balanced package that delivers the kind of performance the racing community has come to expect from Tekin. The advantages of its design are many; its fewer settings can be viewed as a benefit, because this helps users avoid what I call "excessive adjustment overload," i.e., so many potential adjustments that you don't know where to start. It just depends which features are important to you, how adjustable you want your speed control to be and how much you want to pay.

Mike Blackstock recently used his Tekin G-10 to win the ROAR 1/12-scale 4-cell Nationals—the most demanding class of electric racing when it comes to electrical efficiency. Mike's comments concerning the G-10 give some weight to the old

maxim, "Less is more." When asked which features he took advantage of to win one of the toughest races in the world, Mike responded, "Having the sequential current limiters was probably the key. With the 4-cell cars running for eight minutes, run time is a key issue. Most—if not all—of the other speed controls have only one current limiter, while the G-10 has two. I set the first one for 60 amps to get the punch off the line, then, after 3 seconds, the number-2 current limiter kicked in at 40 amps to make sure I would get 8

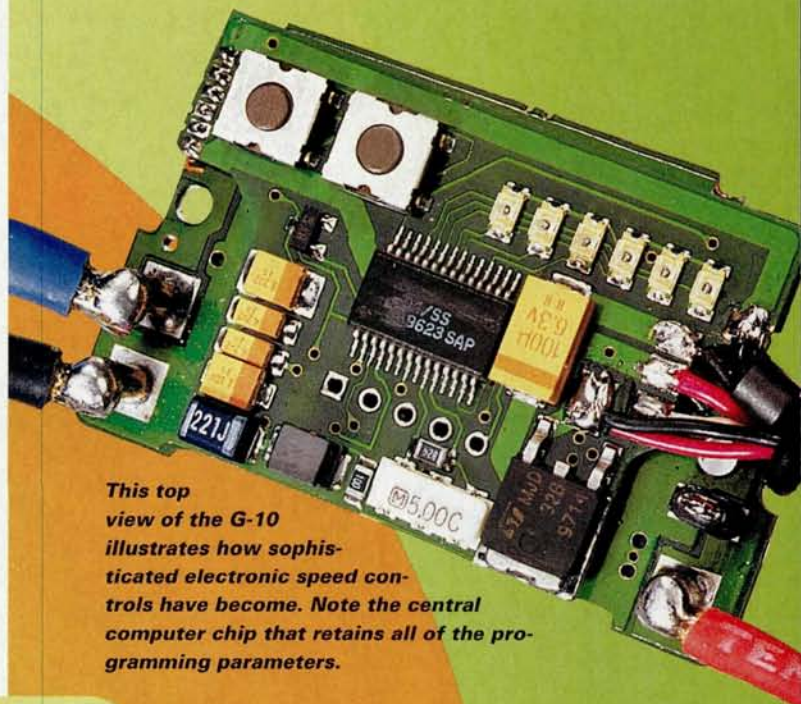
### SPECIFICATIONS

<b>Case dimensions:</b>	1.23x1.16x0.069 in.
<b>Weight:</b>	1.25 oz.
<b>Input voltage:</b>	4 to 10 cells
<b>Motor limit:</b>	6 to 7 cells—none; 8 to 10 cells—12-turn
<b>Resistance:</b>	0.0010 ohm
<b>Rated current:</b>	320 amps (constant), 960 amps (peak)
<b>Braking current:</b>	80 amps
<b>Minimum brake:</b>	adjustable 0 to 30%
<b>BEC:</b>	6 volts/5 amps
<b>Transistor type/quantity:</b>	GoldFET III B (4 forward, 1 brake)
<b>Wire:</b>	12-gauge
<b>Schottky diode:</b>	internal
<b>Accessories:</b>	jumper wire, receiver adapters, servo tape, three zip-ties, three motor caps, motor Schottky diode, decals, instructions.

minutes out of the batteries. Having 60 amps off the starting line gave me enough punch to get the holeshot, and I think that made a big difference."

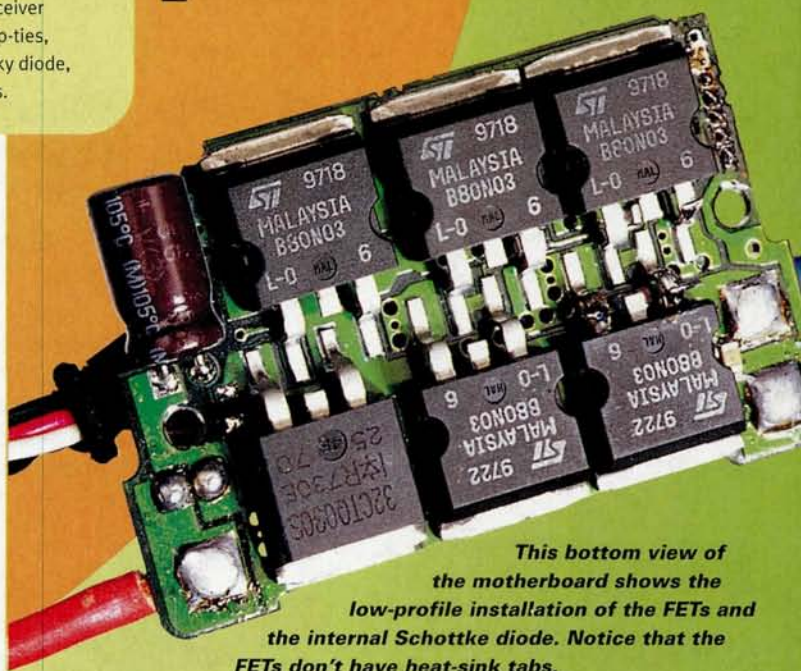
Overall, the G-10 appears to be a very good speed control. Before deciding for or against it, take stock of which and how many features are important to you. If you land on the side of "Less is more," the G-10 may be a great choice for you.

*\*Addresses are listed alphabetically in the Index of Manufacturers on page 217.*



**This top view of the G-10 illustrates how sophisticated electronic speed controls have become. Note the central computer chip that retains all of the programming parameters.**

# Push-button power



**This bottom view of the motherboard shows the low-profile installation of the FETs and the internal Schottky diode. Notice that the FETs don't have heat-sink tabs.**



# Drag racing

by Mike Ogle

AN IN-DEPTH LOOK AT

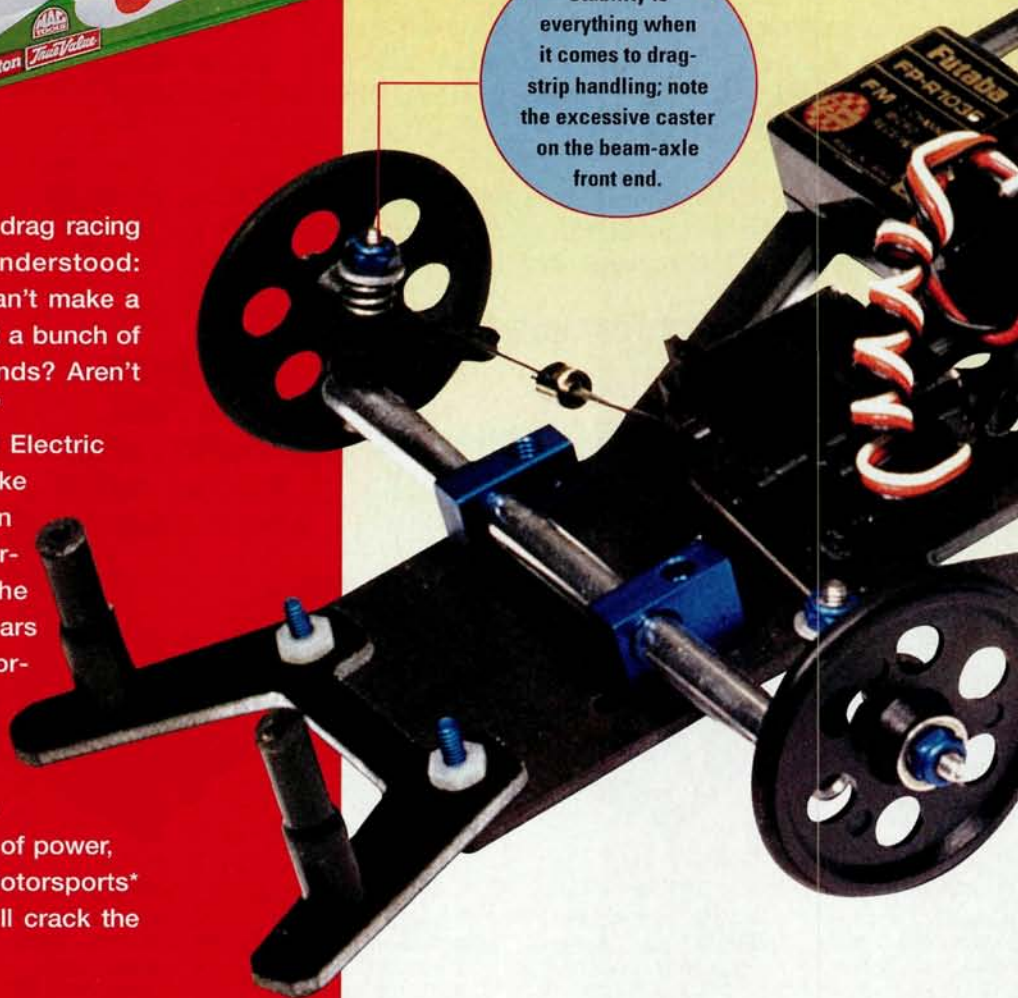
# 101



Stability is everything when it comes to drag-strip handling; note the excessive caster on the beam-axle front end.

**O**F ALL THE types of R/C racing, drag racing must be one of the most misunderstood: "After all, what kind of genius can't make a car just go straight? Don't they just put a bunch of batteries in 'em and drive for 2 seconds? Aren't those cars just yardsticks with wheels?"

After attending a real, International Electric Drag Racing Association (IEDA) meet like the "Big Daddy" Nationals, you get an entirely new appreciation of the performance and technology that go into the making of a winning dragster. These cars are trick, highly specialized, total-performance machines, and no, holding on to them for that 2-second, zero-to-80 burst of wide-open, tire-spinnin' horsepower is not easy! If you've ever wondered what it takes to handle that kind of power, this article is for you; with a Grand Motorsports\* funny car as the subject for study, we'll crack the books on drag racing 101.



# 1/10 C'S MOST **EXTREME MACHINES**

It takes some serious juice to get one of these cars up to 80+ mph in under 150 feet. The latest breed of enhanced 2000 cells is pushing drag cars to new levels of high performance.

High speeds are usually associated with low-wind mods, but the fastest cars actually run mills with around 16 turns.

This Grand Motorsports chassis uses a T-plate to adjust the balance of the rear pod. For straight launches, the same amount of weight must be distributed to each of the rear wheels.

The pull-bar allows chassis "stiffness" and rear traction to be adjusted.

A separate receiver pack is used to keep the servos operating; 10 cells routed directly into the receiver's BEC would not be the hot setup!

*Here's a better look at the dual microswitch throttle/brake setup.*

*This configuration allows the car to coast when neither switch is activated—very useful if you need to let off and correct the car mid-run.*



# The Iceman Cometh



OK ... wanna see something *really* fast? Check out these machines from Chris Collins. The "Iceman" dragster is the current IEDA top fuel rail record holder, which Chris used to post three sub-1.7-second runs. The fastest was a ballistic 1.647-second pass at 81.28mph! Note the autograph from drag-racing legend "Big Daddy" Don Garlits. Big Daddy himself hosted the event at his Drag Racing Museum in Ocala, FL. Much too cool.

The unnamed missile with the lightning bolt paint job is particularly interesting; it's Chris's land-speed-record car, which holds the current record speed of 112.7mph. Chris set the record at Northstar Dragway, the site operated by fellow fast guy Kent Vahlsling (who came in fourth at 106mph). Check out the pics to see how an R/C car can go so fast.



*This is the "speed control." A single microswitch lights up this land rocket; when that pink fuel-tubing pad swings into the switch, hold on tight.*

*The custom-wound G-Force motor is nestled behind the batteries. A carbon-fiber fin helps stabilize the machine, and the angled side vanes generate downforce to keep the car planted. Unlike the flexible wings most of us are used to, these wings are completely rigid and bolted solidly to the chassis; the aerodynamic forces at 112mph are very different from those encountered on the back stretch of an off-road track! The special rubber is from CKW\*. This stuff is bubble-gum soft.*

## FRONT END

You'll find several types of front-end steering-system configurations on today's dragsters:

- **Beam-style front axle.** Often used in the full-body funny car and pro-stock classes, it's usually mounted with one or two pinch blocks. This setup allows you to dial in a bunch of caster, which, as any R/C driver knows, slows down your high-speed steering and makes the car less "twitchy." This simple setup is light and easy to adjust and gives you a little wider front track.
- **"American Flyer" front end.** Usually found on rail-type dragsters, the front wheels are solidly mounted on a front axle that pivots in the center (as found on a kid's wagon).
- **Totally "inboard" front end.** Also usually found on rail-type dragsters. The front wheels are right next to each other and share an axle inside the narrow chassis frame rails.

These second two setups don't give you more than a few degrees of steering, but you shouldn't need even that much at the speeds these cars go. The idea is to just correct the car gently enough to feed it through the timing lights. Besides, if your car is so out of shape that you have to crank the steering around that much, you've probably already lost.

## CHASSIS

Today's R/C drag racers benefit greatly from modern composites. Carbon fiber and graphite are used everywhere for their strength and lightness—sometimes laid up in a unidirectional pattern in which all the fibers run in one direction, instead of the more often seen woven look.

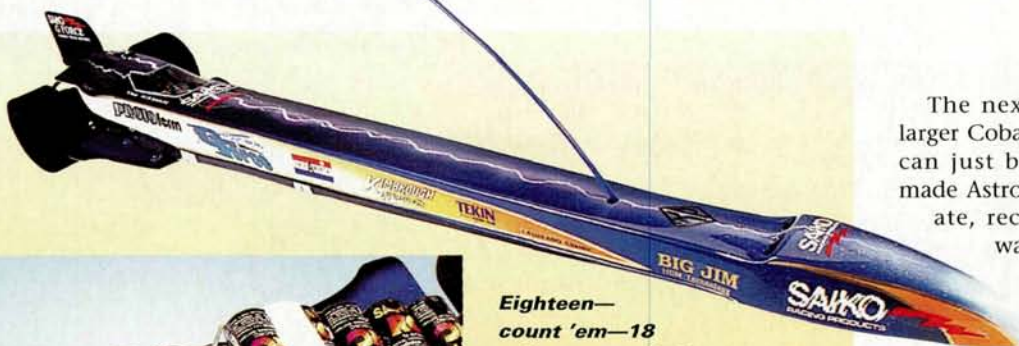
There have been dragster chassis made of fiberglass, Kevlar, aluminum, Lexan, thick carbon-fiber honeycomb (courtesy of those former aerospace guys), graphite arrow shafts and even wood! Some of these flex and give the chassis a little more "arch" on takeoff, while others are more rigid and don't allow the chassis to

absorb power that might otherwise be harnessed to propel the car forward.

The Grand Motorsports car featured here has a simple, yet ingenious system to adjust chassis flexibility. A simple pull-bar "damper" uses silicone rubber tubing and a sliding collar to stiffen or "loosen" the chassis to suit track conditions. Just as in on-road and oval racing, when the track has a ton of bite and traction is no problem, you can run your "suspension" stiffer by sliding the rear collar toward the front post. When the track is a little loose, a bit more chassis flex can soften the power delivery to the rear tires and give the car a better chance of hooking up.

## BATTERIES

The most distinguishing feature of R/C dragsters is the number of cells they're allowed—from the 7-cell econo-rails to the 8-cell pro-stock cars and the 10-cell "Alky" classes on up to the 20-cell top fuelers. If you've ever driven a car with a standard 6-cell pack and then dropped in a 7-cell pack, you've felt the power difference that



**Eighteen—count 'em—18 cells power this juggernaut to buck-plus speeds. The G-Force chassis is stiff enough to handle the weight.**



**No BEC circuit is going to sweat 18 cells, so an itty-bitty receiver pack powers the receiver and servos. At double the legal speed limit, any glitch could reduce the car to splinters, so Chris relies on a Tekin\* TFM 27 receiver to keep everything under control.**

**Very trick. Dual nose wheels are shod with O-ring "tires" and swing behind a pivoting steering arm. Not much steering travel here, but drag racing is all about not turning!**



The next step was to shoehorn in a larger Cobalt R/C airplane motor. The big can just barely fit, but the American-made AstroFlight\* motor was an immediate, record-setting success. With its way oversize brushes and seven-segment commutator, it requires very little maintenance, even under a tremendous amp draw.

Chris Fine set a long-standing ET record with a huge "cordite" motor (nicknamed "the Big One") by Graupner\*—a German company specializing in R/C boats and airplanes.

Lately, the standard 05 has made a comeback with new, super, Yokomo\* and Epic\*-based cans outfitted with rare-earth magnets, all the latest brush technology and "pineapple" armatures stuffed with coat-hanger-size wire. These have snagged back many records from the airplane-type units. These new hand-built hybrids aren't cheap, but they deliver tons of stump-pulling horsepower and respectably high rpm.

A popular misconception is that you must use an 8-, 9-, or 10-turn motor for drag racing. This seems logical because lower winds usually equate to a "hotter" motor. But in practice, the 12- to 16-turn motors are the ones setting the new records. With 25 or more DC volts at your disposal, the "rules" change; the ultra-low winds are ballistic in other applications, but for a 2-second burst of power, those motors don't wind up as quickly as the 12- to 16-turn mills. Case in point, Chris "Iceman" Collins' record-breaking top fueler ran a 16-turn mill to post an 81.28mph run.

## TIRES AND WHEELS

Up front, most R/C drag cars wear "pizza-cutter" front wheels and tires that are simply neoprene rubber O-rings stretched over them—minimum weight, minimum rolling resistance and not much steering. But, then again, we're not going out to do Zanardi donuts in the street—you just don't need that much steering.

There are two schools of thought on rear tires and wheels. One camp prefers the smaller, 1/2-size wheels shod with 2.2- to 2.5-inch-diameter foam. This setup gives a lot of traction by allowing the wheel to "wind up" a little within the tire and absorb the sudden shock of horsepower instead of breaking the tires loose immediately. Of course, this means the tire is absorbing power that could potentially be used to propel the car forward. Some proponents of the 1/2-scale, "little wheel, big foam" technology glue their tires only to the outer edge of the rim; at speed, centrifugal force "grows" the tires,

a little more voltage can provide. Well, try a dozen or more cells in a car that weighs less than 40 ounces ready to go. It can be thrilling (or terrifying) to pull the trigger on that much horsepower!

Almost every type of Ni-Cd battery has been tried in dragsters with some success—some more than others. As far back as I can remember, R/C drag racers looked for extra power, or at least equivalent power with less weight—hence, the widespread use of 1/2 sub-C 600mAh and 2/3 sub-C 1000mAh SCR cells, especially in the "dozen-and-over" classes. These cells have just about the same voltage characteristics as standard sub-C R/C batteries, but their capacity is lower—hardly a factor in a 2-second race.

Voltage and internal impedance numbers are what the drag crowd lives by, and in the past year, the new voltage-enhancing technology ("zapping") dropped about every ET record in the book. Frank "Flash" Martorelli of Grand Motorsports clicked off an unbelievable string of 1.8-second pro-stock runs using the new,

high-voltage 2000s. Although the "full-size," high-capacity cells might seem like the last thing you would need for the one-squirt-and-it's-over world of drag racing, these new cells offer compelling advantages: they are much more reliable and consistent, and they tolerate rapid discharge rates better than other cells. There really isn't a weight disadvantage, since even with 2000 cells in place, the cars can meet the minimum weight requirement for each class. If you're going to add ballast to a chassis to make the weight, the extra ounces may as well be better batteries. Don't be surprised if you read about an R/C dragster going as fast as 120mph this year with the new cells. It's within reach.

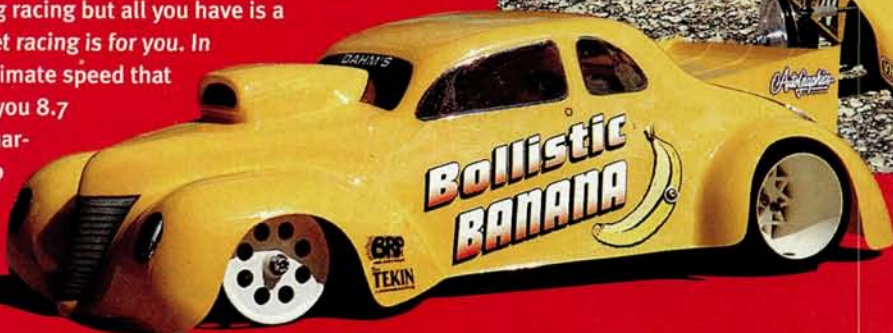
## MOTORS

Like batteries, just about every type of electric motor has been tried in R/C drag racing. In the late 1980s, regular 05 can motors were stuffed with Cobalt magnets: more magnet equals more torque—yeee-hah!

## BUDGET DRAGGERS

We've featured some high-zoot cars on these pages, but you certainly don't need a ton of dough to go drag racing. Bolink offers excellent funny car and dragster kits (shown) that are durable and inexpensive. If you don't have the bucks to get a purpose-built car, just about any direct-drive pan car can be converted for drag racing; check out the "Bollistic Banana," converted from a Bolink Legends car (for details, see "How to: Get into Drag Racing on a Budget," by Rick Eyrich, in our May 1997 issue). In a future issue, we'll show you how to build your own drag machine from an old pan car—cheap!

What's that? You want to go drag racing but all you have is a monster truck? No problem. Bracket racing is for you. In this class of drag action, it's not ultimate speed that counts, but consistency. If it takes you 8.7 seconds to traverse the 132-foot quarter-mile, your objective should be to make an 8.7-second pass every time. Slow or fast, it's your ability to repeat the performance that matters most!



effectively reducing the gear ratio as the car goes through the lights. It works, and records have been set that way, but cars have also been totally destroyed when a barely glued tire "snapped" off the rim at 70-plus mph.

Meanwhile, the "big rim" camp prefers the standard 1/10-scale wheels with a low-profile foam tire. This gives a very clean, controlled setup that can be especially effective for racers running 12 or fewer cells.

Common to all drag racers are their super-top-secret rituals of tire "saucing." Traction compounds ranging from your normal wintergreen-based concoction to transmission fluid to slot-car "Tire Bite" are all used, and all drag racers will tell you that proper tire dressing is essential to winning. What they probably won't tell you is how many drops of what, rubbed in or soaked in, left standing or wiped off they actually use. Members of one club in the Northeast even use a compound they call "moose poop"! I don't think that's an accurate description; I just think they don't want anyone nosing around for their secret formula. Don't worry, we won't!

### SPEED CONTROLS

Generally, draggers don't use them. Some racers have successfully campaigned dragsters with electronic speed controls (ESCs), but the most common setup is the use of one or two 25A microswitches triggered by a tiny servo.

If only one microswitch is used, it is usually closed, shorting the motor to itself; but when it's depressed by the

servo arm, you get full-on power *right now!* Let off the throttle at the end of the run, and the switch goes back to shorting the motor to itself; this brakes the motor and brings the car to a quick stop.

With a double-microswitch setup, one switch acts as the "go" switch and the other acts as the brake. The advantage of this is that there is a middle position, "coast," in which the servo isn't activating either switch. This is useful because it allows you to momentarily lift off the throttle if you get out of shape during a run, and the ability to coast allows you to set the steering trim before a launch by installing a 4-cell pack and then blipping the throttle and coasting while you adjust the trim.

If you think the 100A-plus draw of a typical top fueler on takeoff should theoretically weld shut a 25A-rated microswitch, you're right; it has happened, but surprisingly few times. They seem to be able to take it—at least for short periods, but the fast guys replace them pretty regularly. (If you're curious, the switch is a BV3-2900 D9. It's sold under a few names, but that's the number on the switch. Don't use anything else!)

### BODIES

R/C drag racers have a better selection of bodies than ever. Protoform\*, Bolink\*, Parma\* and Dahm's\* deliver killer shells that range from top fuel dragsters and funny cars to early hotrods. And boy, do these guys love their trick paint jobs! If there's a better-lookin' group of concours-quality racecars than those on the IEDA circuit, I have yet to see them.

With luck, you can last a whole season with the same body. After all, contact with another car (or the retaining wall) is heavily frowned on. Without so much luck, you can destroy your body in less than half a second. Most guys have a spare, just in case. The Castrol funny-car body and the Chris Collins machines shown in this article are all by Protoform. [Editors' note: Mike Ogle painted all the aforementioned bodies. Take a little credit, Mike!]

### AND OTHER THINGS ...

Like on the real dragsters, every component is scrutinized for excess weight. Aluminum and nylon screws replace heavier steel fasteners, mini- and microsensors are shaved, drilled and lightened—anything and everything is done to lighten the load. R/C drag racers are more weight conscious than Jenny Craig. Everything counts!

So if you thought there was nothin' to it, I hope you now have a better picture of just what it takes to successfully set up an R/C drag-race machine. And we haven't even started to discuss race strategy, timing systems, reaction times, throttle delay, or any of the other numerous factors that play a part in successful drag racing (those are coming later!). Drag racing shows us the extreme top end of R/C performance, and in a way, it is rocket science!

\*Addresses are listed alphabetically in the Index of Manufacturers on page 217. ■





# HOW TO

# Make the most of your mod MODIFIED-

by Peter Vieira

**M**ORE SPEED: whether racer or enthusiast, it's what we're all after. In elec-

tric circles, speed equals modified motors—the faster the better. Although machine-wound modified motors deliver plenty of scoot, hardcore racers and speed freaks require the ballistic power of a hand-wound modified powerplant. There's a saying that great power comes with great responsibility, but in R/C, it's more accurate to say that great power comes with a whole passel of questions. Is it always true that lower winds deliver more speed and power? How does a racer know which wind is right for the application at hand? What's the best way to break in a mod? Where should the timing be?

To help you get the most from your motor, we'll explore the myths and realities of modified mills. Our test subject is Trinity's\* new D3, which has been winning consistently since it hit the shelves early this year. Onward!

## WINDS AND TURNS—WHAT ARE THEY?

There will be lots of discussion about winds and turns in this piece, so let's nail this down for good. (Hey, Mr. Modified know-it-all, pay attention; we've heard you guys get it backwards, too.) "Winds" and "turns" refer to the wire wrapped around the motor's armature (arm). The arm comprises three poles, and each pole has two parts: the web (where the wire is wrapped) and the crown (the rounded outside edge of the pole).

- **Turn**—the number of times the wire is wrapped around each pole.
- **Wind**—the number of strands of wire used in each turn. For example, a ROAR-legal stock motor is always a 27x1, or a "27-turn single." That's a single piece of wire wrapped around each armature pole 27 times. A 17x3 mod uses three strands of wire wrapped around each pole 17 times; you get it.

## WHAT WIND WHEN?

There's no easy answer here. To pick the right mod for your car and track, you must do some testing. However, there are some rules of thumb that make choosing the right mill easier.

*In general:*

- **Fewer winds** deliver more torque; that means more squirt off the line but not necessarily more top speed.
- **Fewer turns** deliver greater rpm but produce less torque.
- **2WD or 4WD?** If you have an all-driver, you will probably need a motor with more low-end grunt to motivate the car with authority, since the motor must drive all four wheels and the additional driveline parts such a car entails.
- **On-road (pan cars) or off-road?** Hmmm .... This isn't so easy; both types of vehicle can use similar winds, depending on the track. So let's talk about the track.
- **Loose track or high-bite track?** Go milder if your track is slippery; there's no sense bolt-

## MOTOR CHART FOR THE D3

TURNS	WIND	USE
6	1	Drag/speed runs
7	1	Drag/speed runs
8	2	4WD; high-bite track
9	2	2WD; high-bite track
10	5	4WD; most tracks
10	3	1/10; on-road
10	2	1/10; on-road/oval
11	6	2WD; most tracks
11	3	2WD; most tracks
12	2	High-speed tracks
12	6	4WD; loose tracks
12	3	4WD; loose tracks
12	2	1/10; carpet oval
12	1	2WD; loose tracks
13	3	All-purpose; off-road
13	2	2WD; no-traction track
13	1	1/12; 8 minutes
14	4	Touring cars
14	2	1/12; touring
15	3	Drag/speed runs
16	4	Drag/speed runs
17	3	4WD; high-bite track

ing in a crazy wind if you have to dial in a ton of throttle expo and run the slipper extra loose just to get the power to the ground. On high-bite tracks, bolt in as much horsepower as the tires can handle. But then again, if your track has long straights ....

- **Fast or tight track?** If your track consists of corner after corner with short straights, you'll constantly be braking then jamming on the gas. Get a motor with plenty of low-end torque so you snap out of those turns with authority. On a fast track (think oval), be sure you have plenty of rpm to keep the car moving. If you barely need to get off the gas during your race, there's no sense running a motor with lots of low-rpm power.

We've included a chart (above) to show the typical uses for a variety of winds. This chart was generated by Trinity for the D3, but it is useful for other mods as well. Although the chart is a good guide, you should experiment with different winds and check out what the competition is using to see what works best in your application.

# MOTOR BASICS

## HOW SHOULD I BREAK IN MY MOTOR?

Everyone and his brother has a theory, but the break-in method I'm about to lay on you is guaranteed to get the job done without undue wear. Ideally, you should use a "slave motor" to spin the armature of your new mod; just use a piece of fuel tubing to connect the motor's output shafts. RPM's\* motor station is ideal for break-in work. If you're at the track and don't have a slave motor, just power the motor directly.

*Here's what to do:*

1. Put a drop of light oil on each bearing (Trinity suggests its Royal Oil), and lube the commutator with comm drops (Trinity's Formula 96, if you want to keep it all in the family).
2. Hook up your slave motor (an old stocker or a Mabuchi-style unit) to your new mod. Use a 4-cell pack to power the slave, but run it in reverse so that the mod's armature is spun counterclockwise (when viewed from the output shaft end).
3. Allow the motor to run for about five minutes, then inspect the brushes. When the brushes are fully broken in, the surface will be rounded to match the comm (most brushes are rounded right out of the package; you're looking for a rounded surface that shows even wear across the face of the brush). Before you remove the brushes from the hoods to check them, mark the tops with an X-Acto knife so you'll be able to reinstall them in the position they were removed from.
4. When the brushes have been fully seated, clean the motor with motor spray. Use a spray designed for R/C motors and not automotive products like brake cleaner, which may harm the epoxy that holds the motor winds in place. As a final step, re-oil the bearings.

If you have a new D3, you can skip break-in and go right to running. Why? The D3 includes Trinity's serrated brushes that break in almost instantly, and the wear they get from Trinity's factory dyno test is more than enough run time to make them race-ready. Even if you don't run a D3, the use of serrated brushes can give you the instant break-in effect; this is a great idea if you have a SpeedGems, Gold Dust, or GT touring-car mod. Of course, you can also use the serrated brushes in a non-Trinity mill.

The assembly comprising the motor's plastic endcap, the heat sinks, solder tabs and brush hoods. The D3 endbell features an "inspection port" that makes it easy to check out the commutator.

### SOLDER TAB

The D3 features extra-large solder tabs for easier wire and capacitor attachment. The slotted design allows press-on leads to be used by those who aren't solder-savvy.

### ENDBELL

### HEAT SINK

Brushes get very hot due to the current they carry and the friction generated by the spinning commutator. The heat sink draws heat off the brush to help cool the motor.

### BRUSH HOOD

The "tunnel" that the brush rides in. The D3 features a special stabilizer that presses the brush against the heat sink and reduces brush chatter.



### CAN

The steel can that houses the magnets and armature is an important element of mod-motor performance. The D3 uses deep depressions in the can to move the steel closer to the armature in an effort to strengthen the magnetic field.

### COMMUTATOR

Where the brushes transfer their power to the armature. Since the brushes do this by physically touching the armature, you should keep the comm as clean and as round as possible.



### WINDS

The wire wrapped around the armature determines its performance characteristics. "Winds" and "turns" refer to this wire (explained in the text).

*This is the "XXX" slotted armature of a 12x3 D3 motor. If you look closely at the tabs just beneath the commutator, you'll see three strands of wire soldered in place (three winds); the strands are wrapped around each of the armature's poles 12 times (12 turns).*

## WHAT MUST I DO TO MAINTAIN MY MOD MOTOR?

To keep your motor in top form, follow these motor-maintenance basics:

- **Keep it clean.** Frequent cleaning will prevent debris from fouling bearings and scoring the comm. Racers remove the brushes and springs and blast their motors after every run. After three qualifiers, it's never a bad idea to clean your motor before the Main. Foregoing that, a squirt after each day of running is wise.

- **Keep it lubed.** The bearings in the nose of the can and endbell work very hard and should be lubed periodically to maintain peak efficiency. Re-lube the bearings after every cleaning, and give 'em a drop of oil at the start of each race day. Excess lube will attract dust and may contaminate the comm, however, so don't overdo it.

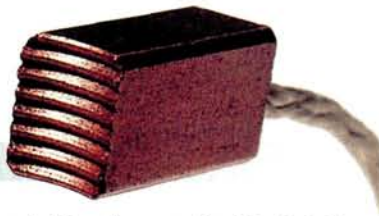
## WHEN SHOULD I CUT THE COMM?

The bottom line is this: if the motor's performance begins to deteriorate, cut the comm. If the motor is performing well, cutting the comm won't increase its performance (but it will extend its life). Most mod racers use a comm lathe to "cut" or true the commutator after 10 runs or so. Some cut more often; others wait until the comm is pretty ugly before they pop it into a lathe.

When you examine your comm, don't worry about the fine lines that result from use; it's nasty, uneven scratches you're looking for. The D3 features an inspection window in the endbell that makes it easy to check the comm; use it frequently.

- **Inspect brushes frequently** and replace as needed. Brushes are a consumable part of the motor; the more you run, the more they wear away. Replace brushes that have worn more than  $\frac{1}{16}$  inch from their "new" length (after break-in) or have turned blue because of overheating, or are chipped or gouged.

The D3 has a special brush stabilizer built into each brush hood to keep the brushes pressed against the heat sink and reduce chatter. To keep the stabilizers working smoothly, use a cotton swab to wipe the inside of the hoods and wipe any dirt or tire dust off the brushes before you reinstall them.



*Serrated brushes are the ideal choice for quick break-in and can extract better performance from motors with less than perfect comms. The fine ridges allow the brush to seat quickly, and that prolongs comm life.*

After cutting the comm, rebuild the motor with fresh brushes and repeat the break-in procedure. Once again, you can use serrated brushes for instant break-in. Even if you don't cut the comm, serrated brushes provide an advantage because the fine serrations conform more easily to the uneven surface.

## WHICH TYPE OF ARMATURE SHOULD I USE?

The D3 accepts three types of armatures, and Trinity's Neil McCurdy suggests these applications:

- **XXX slotted arm.** Created just for the D3, this is best for off-road and touring cars.
- **"Wide-web" arm.** Used in the D2, this is good for on-road and oval racing,  $\frac{1}{10}$  to  $\frac{1}{12}$  scale.
- **Kinwald arm.** Used in the original Kinwald motor line; give this a try in off-road applications and  $\frac{1}{12}$  scale.



*In this view, the difference between the Kinwald Series armature and the D2 armature is apparent; the "webs" are thicker on the Kinwald arm (left) than on the D2 arm (right).*

## HOW SHOULD I ADJUST THE TIMING?

All D3s have at least 5 to 10 degrees of timing, but some modified motors (such as Trinity's Gem and GT series) leave the factory with zero degrees of timing; that means the brushes are centered directly over the motor magnets. To advance timing, the endbell is rotated counterclockwise, opposite the armature's rotation. This will increase rpm and torque, but it also increases amp draw, which diminishes battery life. There is also a point of diminishing returns; if the timing is advanced too much, the motor might produce more no-load rpm, but you won't see any performance gain on the track. For most winds, 15 to 18 degrees is safe. Milder motors are more tolerant of advanced timing; let motor performance be your guide.

If the timing is adjusted past zero degrees in the direction of armature rotation, timing is said to be retarded; this is detrimental to performance and is never used. The safest bet is to leave the timing at zero; this will give the longest run time for that wind and will prolong motor life.

This isn't the forum for a gear-ratio discussion, but to best take advantage of timing changes, expect to alter your car's gear ratio.

*This shot shows the solid construction of the Kinwald and D2 arms and the slotted design of the D3's armature. Each armature delivers slightly different performance characteristics.*



\*Addresses are listed alphabetically in the Index of Manufacturers on page 217. ■

# RACER sponsored by **MIP** *Race With Us* **news**

## GET UP TO SPEED WITH ...

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This edition of "Racer News" is dedicated to the upcoming IFMAR Electric On-Road World Championships and the International Scale Touring Car (ISTC) World Cup to be held at that event. All of the people and products mentioned in this column are connected in some way to IFMAR Worlds or have a lot at stake in the event. HPI's Kent Clausen has been instrumental in the company's success and has taken the company in new directions that many considered unheard of in such a small industry. Coincidentally, Kent Clausen is this month's "Innovator at Work," so here's your chance to find out what goes on at HPI from one of the company's most colorful personalities.

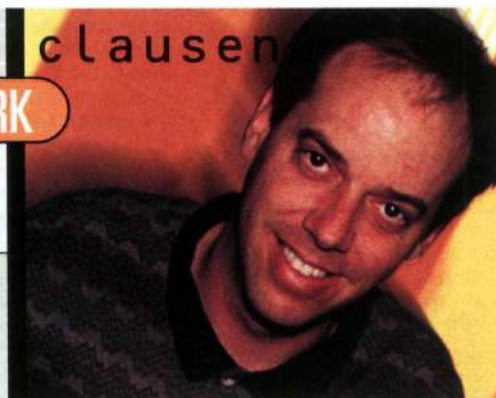
Team Associated/Team Yokomo factory driver Mike Swauger will defend his 1/10-scale championship at the Worlds against one of the most talented fields of drivers ever assembled. We recently had the chance to interview Swauger, and you can find out what he said in this month's "Racer Profile."

You'll also find some go-fast, on-road goodies from Reedy, Trinity, TRC, Yokomo, Team Losi and Roadrunner in our latest installment of "Speed Shop." As a bonus, in our "From the Winners' Circle" section, you'll find Team Trinity driver Joel Johnson's winning Team Losi Street Weapon setup that allowed him to capture the ROAR Carpet On-Road Nats.

## kent clausen

### INNOVATOR AT WORK

Kent Clausen runs the advertising and graphic-design departments at HPI, and when it comes to designing new products, he is one of the major thinkers. He is also a talented racer (as you will soon find out), so his ideas are taken very seriously. New readers may not be aware of Clausen's exciting past, so we have prepared this little interview that should make RS4 owners even prouder to own an HPI vehicle.



**R/C Car Action:** First of all, Kent, thank you for giving us this opportunity to interview you. Many of us old-school R/C racers are familiar with the name Kent Clausen and with your exciting and eventful career in R/C racing. But for the benefit of our newer readers, we'd like to ask you some questions about your past before we get into your successful career with HPI.

Kent Clausen: Sure, George, fire away.

**RCCA:** What was your first R/C experience, and when did you first start to take R/C racing seriously?

KC: Way back in—gasp—1977, I drove a rental R/C car at a county fair. The minute I drove it around the track, I knew I was hooked.

**RCCA:** How long did it take you to become sponsored, and who were those sponsors?

KC: I bought my first car in 1978 and received full sponsorship from Associated Electrics in 1979, with the help of Mike Reedy. I still have the first box that Reedy ever sent me ... it seemed like Christmas when I got the box in the mail and opened it to find a treasure of R/C parts.

**RCCA:** What were some of your biggest victories?

KC: Winning the first-ever—gasp again—Electric IFMAR World Championship in 1982 had to be the best race. Not many people can say that they're a world champion at anything, and I consider it a great honor. I'm also very proud of winning seven ROAR Nationals; my favorite was when I lapped the field at one of

the 1/12-scale oval nats. And, of course, the R/C Thunderdome was always huge, and I have won my share of those events.

**RCCA:** What is your most memorable R/C experience?

KC: It would have to be this interview ... heh heh. No, scratch that; winning the Worlds is my most memorable R/C experience. But honorable mention goes to all the great times I've had traveling the world with my teammates and fellow racers. I had a great time during my competitive racing career.

**RCCA:** When did you first decide to make a career in R/C?

KC: Shhh, don't tell my mom. She still thinks I have a real job. In 1985, I made the "big move" and quit my job to start Lavco USA. People still tell me that I have the ultimate job. It's a lot of fun.

**RCCA:** How did you become involved with HPI?

KC: I've known [HPI owner] Tatsuro Watanabe since 1984. In 1994, he offered me a chance to make real changes at HPI and promised to make exciting new products. That was all I needed to hear!

**RCCA:** HPI has grown from a company that was predominantly known for its aftermarket touring-car wheels to a major R/C car manufacturer; in your opinion, what is HPI's secret to success?

KC: We have a great staff who enjoy R/C. It's a business, but everyone gets really excited when we think about new products and then see or drive those products for the first time. It's not uncommon to see R/C cars bombing around our factory at lunch or after work.

**RCCA:** We've always been impressed by the quality of HPI's ads in *R/C Car Action*; is it true that you're the man who creates all the ads and paints many of the bodies that are featured in them?

KC: Stop it, George. Yeah, I do the ads, boxes, decals, and shirts and paint jobs. I have painted thousands of R/C bodies in my career, so they kind of force me to do it. I can't take all the credit, though; we have two other people in our graphics department who contribute a lot: Frank McKinney and Manny Hidalgo.

**RCCA:** The HPI website is one of the coolest R/C sites going. It's filled with product information, new parts updates, setup tips and compelling editorials—all of which are updated frequently; how does HPI keep the website looking so fresh all the time?

KC: Most of the credit goes to Frank McKinney,



# RACER **n e w s**

(Continued from previous page.)

our in-house Web guy. Frank is a true R/C fanatic. He had his own site dedicated to HPI stuff before we hired him. Actually, his personal site was so good that I emailed him to see whether he wanted a job. We moved him and his stuff—comprised mostly of R/C equipment—from Texas to California! Our concept for the site is to keep it fresh. Frank updates it and answers all the email every day.

**RCCA:** What do you like best about working with HPI? And what is the toughest part of your job?

**KC:** The best thing is that I help to design exciting new products and help to promote them. The toughest ... writing instruction manuals; man, those things are brutal.

**RCCA:** What is HPI's hottest-selling kit? Best-selling accessories?

**KC:** We have so many hot kits right now; the RS4 MT and Nitro RS4 Racer are probably the hottest. Accessories like our wheels and tires are always hot. We really try to keep one step ahead of our competition. I think that racers and hobbyists like to see innovative new kits and parts. Hot-selling kits and parts are rarely copies of existing products.

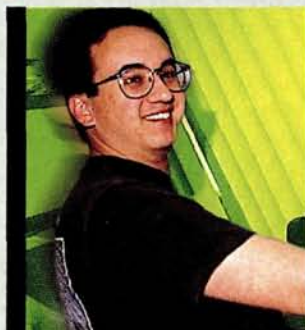
**RCCA:** We understand that HPI has decided to sponsor drivers and to start an HPI racing team. What led HPI to reach such a decision?

**KC:** Well, touring cars are just now becoming more competitive. This will be the first year for the IFMAR World Cup and, based on input from our website, customers want to see an RS4 in the winners' circle. So it's a natural progression to field a team of top drivers and compete at the highest level of competition.

**RCCA:** Lately, the question of money has come into play at the top level of the R/C racing scene; what are your thoughts about paying drivers a salary to race?

**KC:** I think that racers who dedicate their lives to R/C should be compensated. It is really more than a hobby to those guys, and they are the best at what they do. As long as they help promote HPI in a positive manner and don't compete against racers who pay for their parts, I

## INNOVATOR AT WORK



**Master Web guy Frank McKinney answers much of the email sent to HPI every day.**

think salaries are a necessity for a very small group of dedicated racers.

**RCCA:** Will HPI have team drivers at the upcoming IFMAR On-Road World Championships to compete in the Touring Car World Cup? If so, can you mention which drivers will represent HPI?

**KC:** Yes, we will have a team. And no, we cannot say who will be on the team; the contracts aren't finalized yet. I can tell you this: I won't be driving!

**RCCA:** Besides R/C, what are your other hobbies or interests?

**KC:** I have a family now—a terrific wife and 3-year-old daughter. I've played tournament golf in the past and hope to get back to that very soon. I'm hooked on Internet gaming. I play a game called "Subspace" every night. We have a team and compete in league matches. Links LS "98 Golf" is pretty good on the Internet, too.

**RCCA:** So how does the future look for HPI?

**KC:** I see nothing but good ahead. We have a huge list of new and exciting products for 1998. We've just doubled the size of our facility in California; we're tripling the size of our Chicago trade-show booth; and we've just announced that an HPI branch will be launched in Europe this year. We're having fun!

**RCCA:** Kent, thanks again for giving us this opportunity to speak with you. We wish you and everyone at HPI continued success. And good luck at the Worlds!

## Speed Shop



### Roadrunner Xpress goes Pro

Although the Roadrunner Xpress may not be a well-known car on the East Coast, it's extremely popular in Southern California, where touring-car racing is one of the most popular classes. The car's popularity is sure to increase when word gets out about the new Pro '98 version, which has already captured its share of major victories. With basically a box-stock Xpress Pro '98, Roadrunner driver Dave Loftin took first place in the competitive Sedan Modified class at the Trinity Road Course Shootout and then won top honors at the prestigious Hong Kong International Grand Prix against a field of 210 top-ranked touring-car drivers.

If you're wondering what makes this car so hot, check out some of its features:

#### Graphite

- > upper and lower chassis plates
- > front and rear shock towers
- > rear hub-carrier support
- > complete set of hinge pins

#### CNC-machined aluminum

- > front and rear bulkheads
- > rear hub carriers
- > front knuckle arms (axle carriers) and upper arm joints

The car also includes full bearings, front and rear ball universals, lightweight ball diffs, direct-point steering, improved oil-filled shocks, stick or saddle-pack battery mounting and adjustable everything. This is only a partial list of the Pro '98's hot features. A "Thrash Test" is already on the way, but for more information, give GHI\* (Roadrunner's U.S. distributor) a call. You Mini-Class drivers should check out the Mini Xpress Pro; it includes most of the Pro '98's features, plus a few unique features of its own.

GHI, 2378 N. Orange Mall, Orange, CA 92665; (714) 921-0322.

### VIS-ExTRA Cells

Trinity\* recently revamped its entire battery line with a completely new, state-of-the-art battery-matching system. Trinity now has three levels of matched batteries that undergo Trinity's voltage-increasing system (VIS). The three-level system includes VIS Ex-TRA Sport Tech; VIS Ex-TRA; and VIS Ex-TRA Team Edition. All packs are matched on Competition

Electronics'\* new Turbo Matcher 4, which is more accurate than the previous system. Trinity oversees the entire matching process via computer by factory-trained experts. The cells feature new labels with more information, include mW (milliwatt) hours, and all numbers are brought out to the next decimal for utmost accuracy. The VIS Ex-TRA Team Edition batteries feature some incredibly high numbers and are used by all Trinity factory drivers. Racers can now purchase batteries according to specific application and budget.





## Yokomo knows how to Stretch Performance

Yokomo's\* new Inch Up Wheels are an inexpensive way to boost the performance of your touring car. Inch Up wheels feature a slightly taller diameter (50mm as opposed to the industry standard 48mm) and are designed to stretch the tire to provide a slightly lower sidewall. For precise tuning, Yokomo offers optional foam inserts in several thicknesses. When mounted on the wheel, the tires operate with less sidewall flex, which means that they'll operate more consistently.

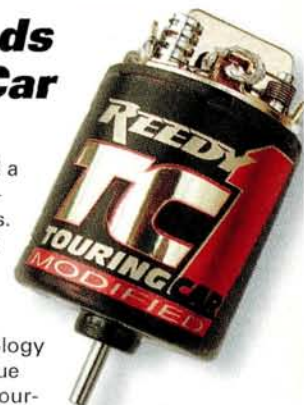


Inch Up wheels are available in 5- and 10-spoke designs and are white, so they'll look new longer. Choose from standard narrow (26mm), mid-narrow (24mm), or super narrow (20mm). Pair the Inch Up wheels with a set of Yokomo's Mid Narrow Sprint tires (available in firm, medium and soft compounds) for unparalleled performance. Team Trinity/Team Losi factory driver Joel Johnson TQ'd and won the highly competitive Sedan Modified class at the ROAR Carpet On-Road Nats with Yokomo Sprint tires. The Sprint tires are available only in mid-narrow, but they are the perfect choice for Yokomo's new mid-narrow Inch Up wheels.

The best part about Yokomo's Inch Up Wheels and Sprint tires, however, is their price; the wheels cost \$3.50 and the tires, only \$7.75. Give your hobby shop or Yokomo USA a call. Yokomo USA's new phone number is (714) 252-8663.

## Reedy Modifieds goes Touring-Car Racing

Reedy Modifieds\* has just released a specially tuned motor that's specifically designed for 4WD touring cars. The TC1 motor is based on Reedy's World Championship-winning "Sonic" series modifieds and uses Reedy's exclusive large-commutator/laydown-brush technology that produces the outstanding torque characteristics necessary for 4WD touring-car racing. According to Reedy Modifieds, the motor's larger comm, along with the "turbo-action" cooling fins on the armature, make the TC1 much more resistant to heat damage—a concern of many modified touring-car racers—and, therefore, it requires less maintenance. The larger-diameter comm also has lower electrical resistance because it has more conductive material, and the motors are equipped with specially tuned touring-car springs and brushes. The TC1 is Reedy's first motor designed specifically for touring-car racing, and it's not just another "one-size-fits-all" buggy motor. Many winds are available for both 4- and 5-minute racing heats (see below).



Part nos.: 550—14-turn; 551—13-turn; 552—12-turn; 553—11-turn; 554—10-turn; 555—9-turn; \$75 each.

## TRC Foam Tires for your Sedan

One of the first products to leave the newly reorganized and retooled TRC\* factory is the new Ground Force Touring Series mounted and trued touring-car wheels and foam tires. The new tires are mounted on lightweight, stylish-looking BBS-type white or black wheels and come in standard hex and offset to fit HPI, Tamiya, Kyosho, Yokomo and all others with the same hex and axle diameters. TRC also has standard hex and offset wheels and tires to fit the Team Losi Street Weapon. Although foam tires are predominantly used for racing on carpet, they're also very useful for racing on slick outdoor asphalt tracks (if permitted by your club). If you're looking for a wide variety of compounds, TRC has 'em. Of course, you'll find the standard Green (medium) and Blue (firm) compounds, but TRC has all the exotic compounds a serious racer could ask for.



The tires come in a new blister-pack sealed package, and the durometer reading at time of manufacture is printed on it. Durometer information is incredibly useful because not all foam tires are created equal. In other words, one pair of Blue-compound tires may be slightly harder (or softer) than another pair manufactured at the same factory. Fortunately, foam tires are sold in pairs, which ensures that tires within that pair are identical. Now, racers will be able to fine-tune their vehicles by selecting a pair of Blue-compound tires that are slightly harder or softer instead of mounting a different compound on their vehicles. The higher the durometer number, the harder the rubber; what could be easier?

### ■ Standard compounds

Part nos.: Green—TT1041; Blue—TT1042; Double Blue—TT1043; \$14.99/pair.

### ■ Exotic compounds

Part nos: White—TT1050, \$17.99; Gray—TT1051, \$17.99; Platinum—TT1052, \$20.99; Pink—TT1053, \$20.99; Purple—TT1054, \$20.99; Red—TT1055, \$20.99.

## New On-Road Goodies from Team Losi

Team Losi's\* new LST "S-11" Intermediate Tire for touring cars is designed for situations in which racers need a tire that falls somewhere between the slicks and the treaded tires currently offered by Team Losi. Like Losi's other touring-car tires, the LST "S-11" features an extremely low-profile sidewall for improved handling and includes top-quality molded inserts. At press time, Losi had not yet decided which rubber compound the tires will be molded from, or the type of insert that will be used, but that information should be available by the time you read this. Part no. A-7711; \$13.95/pair.



## How about some new Team Losi hoops to go with those new tires?

Team Losi has just released its new Split-Spoke/Extra Offset wheels for the company's Street Weapon touring car. Although the new Split-Spoke wheels are a stylish way to dress up your Street Weapon, they're designed with the serious racer in mind. The new wheels are lightweight and rigid and feature a greater offset, which creates a wider track to take advantage of the current IFMAR maximum-width ruling. Keep in mind, however, that some body shells may not fit over the Street Weapon with the Split-Spoke/Extra Offset wheels attached, but most 190mm shells will work just fine. So if you're looking for a stylish way to boost the performance of your Street Weapon sedan, look into these hoops from Team Losi.

Part no. A-7803; \$6/pair.

## FROM THE WINNERS' CIRCLE

### Joel Johnson's ROAR-winning Street Weapon

Team Trinity/Team Losi factory driver Joel Johnson and Team Losi captured their first ROAR Touring Car National Championship at the ROAR Indoor Carpet Nats at Leisure Hours Raceway in Joliet, IL. Although this was Joel's 26th national championship, it was the first national championship for Losi's Street Weapon touring car, and this was cause for much celebration.

Joel was up against a field of factory team drivers and a host of world-class touring-car racers, but that didn't stop him from taking the TQ honors and winning the championship in a one-two sweep.

We persuaded Joel to send us his car—with carpet fuzz still intact—so we could scope out his winning setup. Now we're passing the information on to you, so if you want to get dialed, listen up.

#### AFTERMARKET CHASSIS PARTS

- All of Team Losi's graphite chassis and suspension components and all optional light weight drive-line hardware are on Joel's car.
- Trinity aluminum: Monster Motor heat sink, motor clamp, servo mount and rear brace.

#### REAR SUSPENSION

- Shock oil: Trinity 100WT
- Springs: Trinity Purple prototype
- Swaybar: none
- Camber: 1 degree
- Inner camber-rod location: middle row, outside hole on bulkhead
- Outer camber-rod location: outside hole on hub carrier
- Toe-in: 3 degrees
- Tires: Yokomo Sprint
- Traction additive: Trinity Tire Tamer

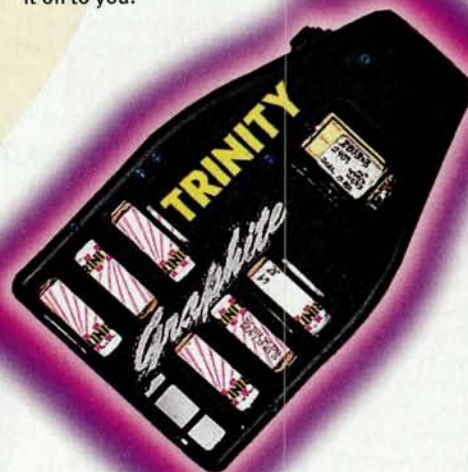
#### FRONT SUSPENSION

- Shock oil: Trinity 100WT
- Springs: Trinity prototype stiff Purple
- Swaybar: yes — 0.063
- Camber: 2 degrees
- Inner camber-rod location: inside hole
- Toe-in/out: 0 degrees
- Tires: modified Yokomo Sprint
- Traction additive: Trinity Tire Tamer

#### SPECIAL CHASSIS MODIFICATIONS

To combat the high-bite racing conditions usually associated with racing on carpet and to keep his car from traction rolling, Joel lowered the mounting position of the motor and battery pack on his car. The batteries and motor are the heaviest components of an R/C car, so lowering them drastically lowers the car's center of gravity (CG). Joel cut out battery slots on the chassis and mounted the cells with the left side of the saddle pack slightly more forward than the right for improved weight distribution. Joel also cut out a section of the chassis directly under the motor and slotted the motor-mounting holes on the motor plate to lower the motor so that it is even with the bottom of the chassis. Many Team Losi drivers have used this modification with great success on the Double-X4 off-road buggy.

Joel also tested some prototype front-suspension parts, which may or may not be available commercially. Many Team Losi and Team Trinity drivers plan to continue testing these new suspension components, and when we get more information on these prototype parts, we'll quickly pass it on to you.



# TRINITY STREET SPEC NATIONALS

## Racing Action at Lugnut

The Street Spec Nationals, hosted by Trinity and Lugnut Raceway in Hatfield, PA, proved to be just as exciting as last year's event. Racers from many East Coast states gathered to take a shot at claiming a national title, bragging rights and a nice, big trophy.

The fantastic Lugnut facility provided an enjoyable environment for all the racers. As you walk up to the second-floor shop and track area, you are surrounded by tons of racing memorabilia, from vintage slot cars to Dale Earnhardt's underwear (well, I didn't actually see them, but if anybody has Dale's skivvies, it's Lugnut). At the top of the stairs, you are greeted by a well-stocked hobby shop, a spacious, well-lit pit area, the carpet R/C track, the drivers' stand, a slot-car track and even more racing memorabilia. Two full-size NASCAR bodies hang from the ceiling, as well; maybe—just maybe—these guys really like racing! Of course, the real story here is the close spec racing action—so let's get to it.

### STREET SPEC MAIN EVENT

Fifty-four racers packed into the pits to compete in the Street Spec class. You must be unsponsored to qualify as a Street Spec driver. That's what Street Spec racing is all about; average racers who pay their own way and use their driving talents to win races.

Mike Bednar sat on the pole for the A-main, with Arnie Fie on the outside. These guys were out for blood; they changed positions too many times to count, and if "rubbing is racing," well, these guys were definitely racing. Gordie Beidler and Matt Kemp found their way to the front of the pack. TQ holder Bednar and second qualifier Fie dropped back because of some fender bumping, but Bednar refocused and set out for the front. Slicing through traffic, he was a man on the move. Unfortunately, he ran out of time, although he managed to secure third place as the finish tone sounded; Gordie Beidler edged out Matt Kemp for the win. The finishing lineup was Bill Osborn, John Wallace, Arnie Fie, Jim Trimble and Kevin Griffie.

In his excitement, Gordie yanked the railing off the drivers' stand. We've all done that once or twice, right?

### PRO SPEC

Sponsored drivers cannot compete in the Street Spec class, but that doesn't mean the



Before the races began, all the racers brought up their cars for concours judging.

Pros can't enjoy spec racing. Pro Spec is the class just for sponsored drivers. Whenever Pro Spec racers take to the stand, they put on a show of precision driving as they battle for the TQ position.

This year, Shane Kocher nabbed the elusive top slot with a blistering 58-lap run that destroyed the previous 52-lap record. When asked how he did it, he said just two words: "pop rocks." (We have no idea, either.)

With the announcer's "off the pole," the A-main got under way, and Shane Kocher shot off with the lead. Kirby Hand dropped in behind Kocher, and Phil Marabella slipped into third, with the rest of the field



The A-main Pro-Spec drivers. Shane Kocher (center) TQ'd with a blistering 58-lap run and took the win in the Main with another 58-lap run.



It wasn't easy to squeeze all the race participants into the picture; the track was packed the entire weekend. The concours winners posed up front.



Here are the A-main drivers in the Street Spec event. Race winner Gordon Beidler is behind the trophy (the jacket was part of the first-place award).



Shane Kocher exits a turn, unchallenged. This guy was a dominant force at the event—same as last year.



Racing was close all day long; here is a rare moment when a driver left an opening. If you leave an opening in a race like this, consider yourself passed.

falling in line. Kocher pulled out a slight lead over Hand until the leaders hit back-field traffic, which slightly slowed Kocher.

However, Shane's driving finesse enabled him to slide through traffic, with Hand a few trucks back. At the 2-minute mark, the top three remained in their starting positions. Hand tried to make some moves, only to have lapped traffic hold him up. With less than a minute to go, Brian Burkhart increased the pressure on Marabella. Then, with less than 20 seconds remaining, the drivers began to look for any position they could get, and the wrecks began.

Because of their excellent driving skills, the top three contenders slid through the carnage, and Kirby Hand slipped up to Kocher's back bumper. With just 10 seconds to go, Hand tried to swing out of Kocher's draft and slide by for the win, but Kirby could not complete the pass; he had to settle for second. Just as he did last year, Shane Kocher earned the title of national Pro-Spec champion. Phil Marabella held on to the third position with Burkhart, Verbonitz, Cutman, Flurer and Carpenter completing the A-main field.

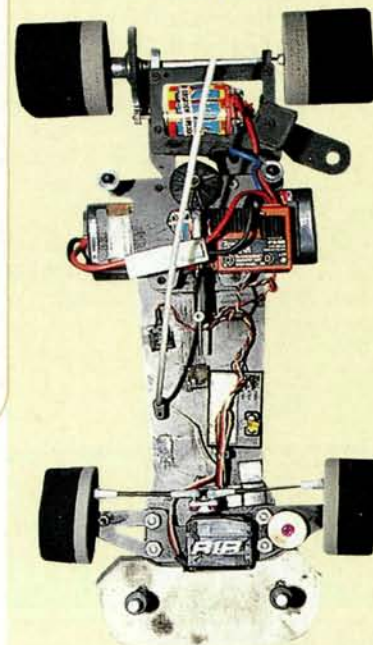
## STREET SPEC

FIN.	QUAL.	DRIVER	CHASSIS	ESC	BODY	RADIO
1	8	Gordie Beidler	Trinity	Novak	Ford	Futaba Sport
2	6	Matt Kemp	Trinity	Novak	Ford	JR R-756
3	1	Mike Bednar	Trinity	Monster FET	Chevy	Airtronics 3PS4
4	5	Bill Osborn	TRC	Tekin	Ford	Futaba Junior
5	7	John Wallace	TRC	Tekin	Chevy	Futaba 3PJ
6	2	Arnie Fie	Trinity	Novak	Chevy	Futaba 3PB
7	4	Jim Trimble	Trinity	Novak	Chevy	JR R-756
8	3	Kevin Griffie	Trinity	Novak	Ford	Futaba 3PB

## PRO SPEC

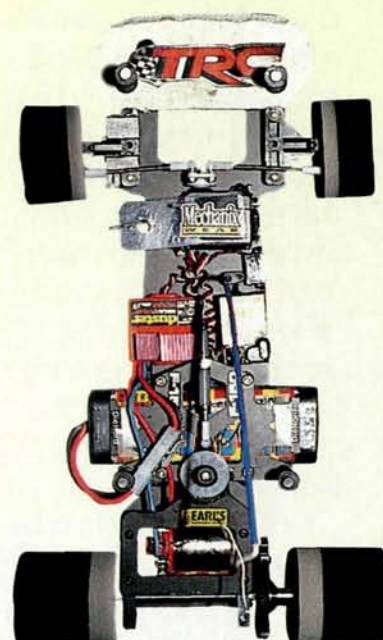
1	1	Shane Kocher	TRC	Novak	Ford	Futaba 3PJ
2	2	Kirby Hand	Trinity	Novak	Chevy	Futaba 3PJ
3	3	Phil Marabella	Trinity	Monster FET	Chevy	Futaba 3PJ
4	6	Brian Burkhart	Trinity	Novak	Chevy	Airtronics
5	4	George Verbonitz	Trinity	Monster FET	Chevy	JR R-756
6	8	Rob Cutman	Trinity	Novak	Ford	Futaba 3PJ
7	5	Jake Flurer	Trinity	Monster FET	Ford	Futaba 3PJ
8	7	Dave Carpenter	Trinity	Tekin	Chevy	Futaba 3PB

## Gordie Beidler's winning Street-Spec car



Gordie Beidler put on an amazing performance in the Main. The car was actually up for sale before the Main, but Gordie changed his mind as he crossed the finish line.

## Shane Kocher's winning Pro-Spec car



If Shane wasn't on the drivers' stand, he was in the pits working on his car. The pristine layout shows his efforts to build a winning car.



## FINISHING TOUCHES

The combination of Lugnut Raceway, Trinity and the racers made for a truly exciting event. Lugnut is a first-class facility that helped the drivers enjoy their day to the max.

Trinity's support of the drivers—and their generosity in awarding great door prizes—enabled everyone to go home a winner, and the racers' enthusiastic support for the sport is certain to help it grow.

Meanwhile, we'll see whether Shane Kocher and Gordie Beidler can hold on to their titles next year! See ya there.

## RACER TIP OF THE MONTH

**Scott Hughes**  
Team Associated Factory Driver

Scott Hughes loves his KO Mars radio system and has a couple of setup tips for it that he'd like to pass along.

KO offers an optional larger grip, and Scott mentioned that the radio feels more comfortable in his hands with the larger grip, even though his hands aren't any bigger than normal. According to Scott, KO also offers optional throttle-trigger springs so you can tailor the feel of the throttle trigger. Scott installed the soft spring and hasn't changed it since. He also likes to place two layers of adhesive foam on the trigger to reduce the play between throttle and brake.

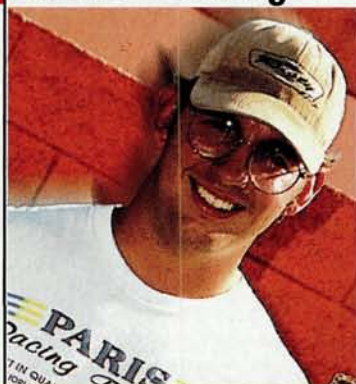
For loose tracks, Scott sets the throttle curve with a negative value so the throttle feel is more linear at the bottom end. For normal and high-bite conditions, Scott usually sets the throttle curve to zero.

## RACER PROFILE

By winning the world championship against some of the most talented racers in the world, Yokomo/Associated factory driver Mike Swauger proved to everyone at the previous IFMAR On-Road Championships that he was the king of  $\frac{1}{10}$ -scale pavement racing. Swauger will soon defend his title at the upcoming IFMAR On-Road Worlds in England. This time, however, he'll be driving for a different team, and the competition will be held on carpet—not asphalt. There's no doubt that Swauger will have his work cut out for him, but many still consider him a favorite.

We had a chance to speak to Swauger during one of his practice breaks; here's our interview with him.

## Mike Swauger



## VITAL SIGNS

Age: 22

Sponsors: Yokomo, Associated Electrics, Reedy Modifieds, Paris Racing, LRP, Team Orion, Andy's and Pro-Line

Years racing: 12

Favorite racing class:  $\frac{1}{8}$ -scale gas on-road and touring car

Occupation: works in R&D for Yokomo; student

Hometown: Antioch, CA

First R/C car: Tamiya Grasshopper

Favorite track: Las Vegas Silver Bowl

Major victories: '96-'97 IFMAR On-Road World Championship ( $\frac{1}{10}$ -scale), and ROAR multinational champion

**R/C Car Action:** First of all, Mike, thanks for this opportunity to chat. You're the defending  $\frac{1}{10}$ -scale world champ, but this year's On-Road Worlds will be much different; the race will be held indoors on carpet instead of outdoors on asphalt, and you'll be driving a Yokomo instead of an Associated car. Do you feel these differences will have an effect on your performance at the Worlds?

Mike Swauger: No, I have a carpet track 10 minutes away from my house, and I practice there three times a week. I will be driving a Yokomo car in the  $\frac{1}{10}$ -scale class, and with help from Ron Paris of Paris Racing and the Yokomo team, I'm sure there will be no problems getting up to speed.

**RCCA:** We understand that you will drive an Associated car in the  $\frac{1}{12}$ -scale class; why are you driving a Yokomo car in the  $\frac{1}{10}$ -scale class?

MS: I'm driving a Yokomo car in  $\frac{1}{10}$  this year because I am now doing R&D and PR work for Yokomo. I will race the Associated in  $\frac{1}{12}$ -scale, though.

**RCCA:** Who will be your toughest competition in each of the racing classes?

MS: I think my toughest competitor will be Masami Hirotsuka, of course; his record speaks for itself. But Joel Johnson, David Spashett, Barry Baker, Greg Hodapp and Austin Hara will also be tough, I'm sure.

**RCCA:** Are you doing anything special to prepare for the event?

MS: Not really; just practicing and getting used to running on carpet.

**RCCA:** What are some of the things you like to do when you're not R/C racing?

MS: When I'm not working, I like to ride my mountain bike, water-ski and work out. I also like to hang out with my friends.

**RCCA:** What's the toughest part about being a sponsored R/C driver? And what's the best part about being sponsored?

MS: The only tough thing about being sponsored is that you're the one other racers are gunning for whenever you race. Besides that, there's really nothing tough about being sponsored. I enjoy helping people at the track, and traveling and meeting new people are also fun.

**RCCA:** What do you like best about R/C racing at the top level of competition?

MS: What I like best is that I always push myself to do the best that I can do. The competition is so close that a fraction of a second could mean taking the TQ or not making the A-main at all.

**RCCA:** You're also a national champion  $\frac{1}{8}$ -scale gas on-road racer; what are the biggest differences between  $\frac{1}{8}$ -scale gas and  $\frac{1}{10}$ -scale electric?

MS: In  $\frac{1}{8}$ -scale gas racing, the races are so long—usually 15 minutes to an hour—that in the beginning, you have to hold back and save your car. You can make a small mistake at the start and make it up by the end of the race. A  $\frac{1}{10}$ -scale race usually lasts only 4 to 5 minutes, which means there is no time for mistakes. You also have to make your move to the front much faster.

**RCCA:** You will also compete in the IFMAR Touring Car World Cup on behalf of Yokomo; how are you preparing for this racing class?

MS: Like in  $\frac{1}{10}$ -scale, I practice a few times a week and am getting used to rubber tires on carpet.

**RCCA:** This will be the second time IFMAR has organized a touring-car exhibition race at a World Championship; what is your opinion on having a dedicated world championship for touring cars?

MS: I am all for a touring-car world championship. Touring cars are among the fastest-growing racing classes in our sport; it would be great to have a touring-car Worlds.

**RCCA:** Mike, thanks again for your time, and we wish you luck at the upcoming IFMAR World Championships.

\*Addresses are listed alphabetically in the Index of Manufacturers on page 217. ■

Need to know what's new? What works well and what doesn't? This section is devoted to objective reviews of all R/C car accessory items. From gears and wrenches to motor brushes and shock springs; if you can use it with your R/C vehicle, you'll find it critiqued on these pages.



**143**  
RAM  
Alarmist



**144**  
GM Racing  
Discharger Case



**146**  
Airtronics  
M8 Radio

## RAM Alarmist

Hey! It's time to switch off!

**D**oes this sound familiar? You're waiting for your battery charger to turn off so you can plop that freshly charged pack into your vehicle and make the qualifier that's about to start. You sit in front of your charger, staring at the charge light in some sort of catatonic trance. You don't dare walk away, though, because you know the moment you leave, the charger will turn off, and you'll lose valuable seconds—a loss that could have been avoided if your charger could notify you when your battery is peaked.

And if you're discharging your pack with a discharge device that doesn't have a safety cutoff, you'd better not leave it unattended, or you'll risk frying those precious cells. Again, you have to sit and watch. Annoying, eh?

What if we tell you that the RAM Alarmist Charge and Discharge monitor is designed to beep when your battery charger turns off (a handy feature that not all chargers have) or your batteries have been discharged to a safe voltage? Sound interesting? Well, RAM—yes, the company that makes all those cool lighting and sound kits for R/C cars—offers this handy item for less than 25 bucks! There's more: you can use the Alarmist to monitor charge and discharge process independently or simultaneously, so you can do both at once and more safely than before.

### INSTALLATION

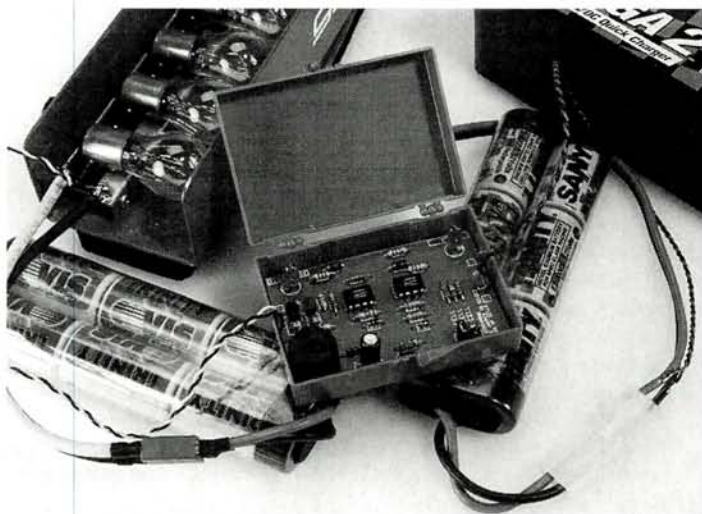
The Alarmist comes with two sets of jumper cables that allow it to be simultaneously connected (permanently or temporarily) to both a charger and a discharge-load device. The red and black wires go to the charger, and the yellow and black wires go to the dis-

#### LIKES

- Very innovative.
- Price.
- Very loud alarm that may be heard through walls.

#### DISLIKES

- Not the most elegant piece of R/C electronics.



*The Alarmist doing its job monitoring a charger and discharger at the same time. Although the unit may not win any beauty contests, it works great and does what it's supposed to do.*

charge-load device. What could be easier to follow?

For temporary installation, use a set of high-quality connectors like Deans\* or Sermos\*, and you'll be able to disconnect the device for ease of transportation or storage.

If you opt for a permanent installation, you can shorten the wires for a more professional-looking job. The Alarmist comes with an instruction and installation sheet and a wiring diagram that makes the process very simple.

### OPERATING THE ALARMIST

Once the Alarmist has been properly installed, there are no buttons to push or dials to turn; just operate your charger or discharger—or both—as you normally would, and the Alarmist will do its job automatically.

• **Charging.** When your charger turns off, the Alarmist will sound an alarm that you'll hear even if you happen to be in another room, and the red LED that's next to the charger jumper cables will light up.

Please note that the Alarmist can't tell whether your pack is fully peaked, but it will sound its alarm the moment the charger stops charging.

The unit does not know whether or not the battery pack is fully charged (peaked). If your battery pack false-peaks, the alarm will go off. If you own a

## RAM Alarmist

(Continued from page 143)

15-minute timer-charger (non-peak-charger), the Alarmist will tell you the moment the timer reaches zero and turns off—again this is no indication that the battery pack has been fully peaked.

• **Discharging.** If not equipped with a safety cutoff, discharge-load devices such as discharge bulbs can damage your batteries by over-discharging, so this new product can save you big bucks in the long run by helping you avoid this. The Alarmist's discharge monitor was designed for 6- to 8-cell battery packs, and it contains a smart silicon chip that allows it to detect when the pack has reached 1 volt per cell (6 volts for a 6-cell pack; 7 volts for a 7-cell pack, etc.). Its alarm will then sound to tell you to disconnect the discharge-load device or suffer the consequences—fried cells!

A second red LED—this one is next to the discharge jumper cables—will also light up when the cells have reached 1 volt apiece.

Again, keep in mind that the Alarmist will not stop the discharge process. It will only sound its alarm when the pack has been discharged to 1 volt per cell. If your discharger doesn't have a safety cutoff, it's still up to you to disconnect the pack from it. If your cutoff device is designed to turn off the discharger at a lower voltage than 1 volt per cell, the alarm will still sound when the pack reaches 1 volt per cell, i.e., before the cutoff device turns off the discharging process.

• **Simultaneously** charging and discharging. If you use the Alarmist to monitor both processes with two packs, you'll find the two separate LEDs particularly handy. When you hear the alarm, the glowing LED will indicate which process has been completed.

### WRAPPING IT UP

Although the Alarmist cannot stop the charging or discharging processes, it's still a great product for busy racers who do not have the time to monitor them.

The Alarmist allows racers to concentrate on other tasks—picking up a lap-counting transponder and washing a set of dirty off-road tires, for example—without having to worry about charging or discharging; and it can help them avoid over-discharging their packs and having to buy replacements. Pick up an Alarmist, and you'll never know how you got along without it.

—George M. Gonzalez

## GM-RACING Discharge Case Minimum Voltage for Maximum Performance

**W**hat makes the difference between going fast and going ballistic? A big factor is how you treat your batteries. Deep discharging helps your packs store as much juice as possible with their next charge. The new GM-Racing\* Discharge Case (part no. GM1263) is a simple and convenient device that pulls your cells down to minimal voltage without harming them.

The unit comes in a hard plastic case that looks like a miniature suitcase.

Inside it are two blocks of wood, six diodes and 12 battery contacts. Assembly is simple; the contacts are attached to the blocks, and the diodes are soldered between them. To use the discharger, just press the battery pack (4 or 6 cells) between

the contacts.

You can use 1700- and 2000-type cells in the discharger. To avoid cooking the unit's diodes, the battery pack should be fully discharged by running your vehicle until it dies, or discharging it with a set of discharge bulbs or other load device. The GM Discharge Case is not meant to be used to dump packs, but rather for deep discharging of packs after they have been used.

Packs may be left in the case overnight to make sure that each cell is fully discharged, but just leaving the

pack in the case until it is cool (about an hour) is also sufficient. This will bring the pack's voltage down to about one volt—now that's dead. An LED or other device to indicate each cell's status would have been helpful, but this omission does not affect the unit's performance.

The advantage of the Discharge Case is that it fully discharges each cell individually, unlike a set of bulbs that dumps the entire pack without concern for individual cell voltage. Depending on the condition of your packs, you may see improved battery performance after just three or four charge/deep-discharge cycles. The GM Discharge Case has revitalized some of my older packs' performance by increasing their run time and punch, both of which had deteriorated enough to relegate them to the "practice" pile.

—Jim Franz

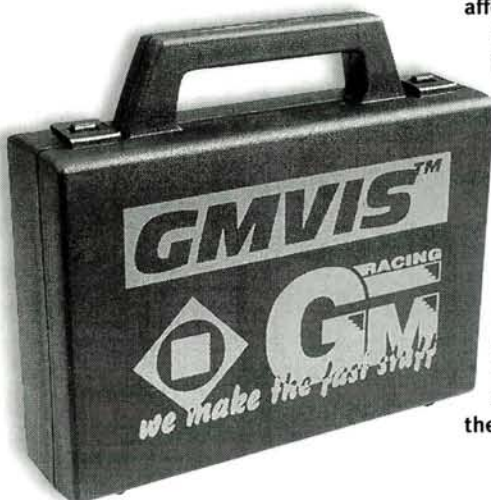


#### LIKES

- Improves battery-pack performance.
- Durable plastic carrying case.
- Discharges each cell individually.

#### DISLIKES

- No visual indication of cells' discharge status.



## AIRTRONICS M8 Radio Professional Pistol

**F**ew high-end radios have enjoyed as much popularity as Airtronics' successful Caliber line, so we weren't surprised when news of an updated super radio from Airtronics caused a stir in R/C car circles last year. Since it hit the shelves, that radio—the M8—has been a hit among enthusiasts and racers. I've had an M8 in my transmitter bag for about a month, and I'm pleased to report that it's excellent; and I'll tell you why.

### USER FRIENDLY

First, I noticed that the M8 transmitter "felt right." Its balance and ergonomic grip almost make it disappear from my hands as I drive, and it's reversible, so it will suit southpaws as well as righties. The digital display and scrolling keys are on the top, so they're easy to view while you're holding the radio in a normal driving position.

The M8 mixes features from the Caliber 3PS with some new functions. An electronic key lock on the top panel allows you to disable the various programming buttons and avoid accidentally changing the program. The Caliber's analog twist knobs have been replaced by easy-to-access, digital step trims, and a display-only switch allows you to turn on the LCD screen for program changes without actually transmitting a signal.

You'll find the Caliber's unique Response Switch on the M8. When activated, it instantly loads any new settings you've selected for the steering and throttle channels to increase or decrease the car's responsiveness.

To gather the waves from the M8, Airtronics includes the new 92836 Super Micro receiver. This 3-channel unit accepts Airtronics' new "Z" connectors, which

#### LIKES

- Well balanced.
- 10-model memory.
- Highly adjustable.
- Easy-access servo-reversing.
- Third channel.

#### DISLIKES

- Drains batteries quickly.

*Each of the trim controls is close to the wheel for easy access while racing. Note the timer button; two timer modes allow you to track your lap times and measure yourself against a goal time. The "display" switch allows the LCD screen to be activated for setup changes without transmitting a signal, and the "aux" dial is used to manipulate the third-channel servo.*



*The arrowed keys are used to cycle from function to function, as indicated by the cursor, shown here highlighting the battery meter. The "inc/+" key and "dec/-" key are used to increase and decrease function values. The steering (ST) and throttle (TH) display shows the trim positions.*

are wired for compatibility with other manufacturers' receivers. All new Airtronics servos feature the Z connector, and the new receiver will also accept servos from JR, Hitec, KO and Futaba (just trim the fin off the plug of Futaba servos). If you wish to use older Airtronics servos with the new receiver, you will have to install a new plug or buy the 99400Z adapter.

In the transmitter's base, a new battery tray holds the usual 8 AA cells and features a charging jack. The tray slides into the M8's "foot" from the back and locks in securely; a cartridge-type Ni-Cd pack is also available.

### ON SCREEN

Radio functions are all permanently printed on the LCD screen. The scrolling button allows you to jump from function to function and flashes a cursor behind the function selected. Once you've arrived at the function you want to adjust, use the "increase" and "decrease" keys to raise or lower the value or to switch the function on and off where applicable.

Steering- and throttle-trim positions are indicated on two bar graphs that show the servo's center point moving along the bar with each click of the trim adjusters. The only function not shown on screen is the third channel, which is operated by the "aux" dial beneath the S-POS button; a servo plugged into the third channel is operated by turning the dial.

### FIELD TEST

I installed the M8 in my HPI RS4 Mini when I reviewed it last month. It had excellent range, and I had complete control over the car even when it was virtually out of sight.

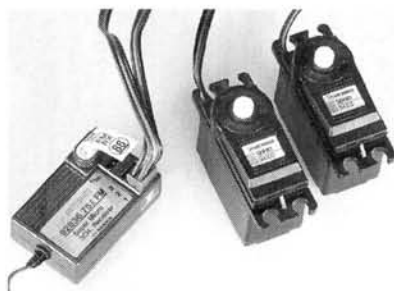
After its glitch-free performance in the Mini, the radio went into my Associated B3, and I headed off for a full day of racing at Long Island Raceway's indoor track. The roof of the building has tons of metal supports that have been known to scramble the signals from budget radios and high-end units. Once again, the M8 didn't show any sign of glitching as I ran in packed heats with another racer just one channel away.

I found the screen and function buttons on the top of the radio very convenient, and the M8's ease of operation makes it easy to



(Continued on page 150)

(Continued from page 146)



*The M8 comes with the new Super Micro receiver and two standard 94102 servos. The system is fitted with new universal Z-connectors. The connectors and receiver are easily identified by their bright blue color (too bad this is black and white!).*

experiment with different settings. Since The LCD screen shows a map of all the adjustment modes, so unlike with some other radios I've tried, I had no fear of "getting lost" amid various cryptic screens.

Among the M8's outstanding features, I did find one downside: it drains the batteries rather quickly. Don't get me wrong; you can probably get several days of racing out of a pack, but if you buy alkalines, it could become quite expensive. To remedy the problem, I picked up 8, Sanyo\* Ni-Cd cells and a charger. Although pricier than dry cells up front, with these cells, I'll save money down the road.

—Greg Vogel

## Features

The M8's adjustable features, as they appear when you cycle through the functions.

- **D-RATE—steering dual rate:** adjusts steering travel in both directions. The M8 displays the value as a percentage of the total available travel range.
- **EPA—steering and throttle endpoint adjustment:** adjusts servo travel on each side of neutral independently; shown as a percentage of total servo throw. Users may set the steering and throttle servos with more travel in one direction than another—useful for setting throttle linkages and correcting for steering systems with unequal left and right throws.
- **EXP—steering and throttle exponential:** varies the responsiveness of the servo around neutral. If set with a negative value, the servo responds less quickly to input from the wheel near neutral and more quickly as the limits of travel are reached. If set with a positive value, the servo will be very responsive around neutral and less so as the limits of travel are reached. The greater the value input to the radio, the greater the difference between maximum and minimum responsiveness.
- **SPEED—steering and throttle servo speed:** allows the speed of the servo to be adjusted. This is used only to slow servo response; the M8 cannot increase transit time beyond the capabilities of the servo as it comes from the manufacturer. The steering servo can be set with different values for "FWD," the steering input away from neutral, and "RTN," the servo's return travel to neutral. The throttle servo's speed is adjustable in the throttle direction (FWD), but not brake.
- **M-SEL—model select:** well, that's pretty obvious! The M8 can store settings for 10 models.
- **M-NAME—model name:** every model stored can be named with up to eight characters, including upper- and lower-case letters, numbers and punctuation.
- **M-COPY—model copy:** if you wish to use a setup that's already in the M8 as the starting point for a new model, this screen will allow you to copy the setting from one memory location to another.
- **M-CLEAR—model clear:** starting over? This function will wipe clean any memory location you select.
- **TRM(SUB)—subtrim:** very fine trim adjustment. The M8 displays this as a value followed by "R" or "L" to indicate right and left travel when adjusting the steering servo, and "H" or "B" to indicate throttle or brake travel on the throttle servo.
- **TRM(RATE)—trim rate:** allows the percentage of servo throw affected by trim adjustments to be altered.

• **TRM(RST)—trim reset:** selecting this option instantly resets the steering- or throttle-channel trims to zero.

• **RSP—response switch settings:** used to program the values that will be activated when the response switch is turned on. Negative values give a milder response (indicated by an "M" after the value); positive values give quicker response (indicated by a "Q"). The steering and throttle values are set independently.

• **LAP-T—lap timer:** used to measure and record up to 99 laps. The lap timer allows you to set a "goal time," and an alarm sounds when that time is about to elapse. This is useful for timing your heats in a race. Once the timer is started by pressing the timer button next to the steering wheel, each consecutive button push records a lap. The lap is displayed for 3 seconds, then the display returns to the elapsed time. After the "goal time" has been passed, the next press of the timer button stops the clock, and you can review the stored lap times—an excellent tuning aid, for sure.

• **INT-T—interval timer:** this timer mode is used to select a target lap time. Once the interval timer has been activated, the radio will beep when it reaches the target time and will then restart; for example: if your goal is to run a 10.5-second lap, just enter 10.5 as the interval timer setting, then hit the timer button as you cross the start line. If you complete the lap as the beeper sounds, you're on the money; if you haven't finished the lap, you'll be able to gauge your performance by how much of the lap you've completed. This is a great way to measure yourself against the TQ; it's amazing how far "two seconds" can be in track space!

• **REV—servo-reversing:** thank you, Airtronics, for making it easy to reverse servo direction! Other high-end radios bury this basic feature beneath too many functions and screens.

• **S-POS—starting position:** displayed as a percentage of servo throw; press this button, and the M8 allows gas racers to set the throttle with a higher idle speed for easier starting and warmup. To deactivate S-POS, press it again, and the servo returns to the regular endpoint settings. While S-POS is activated, the M8 beeps as a reminder to switch it off.

• **Command signal:** adjusts the pitch of the "peep" heard with each button press; the peeping can also be switched off.

• **CONT—contrast:** increases or decreases the darkness of the LCD characters; lower contrasts settings can help prolong battery life.

• **BATT—battery meter:** in addition to the M8's "gas-pump" battery-level icon, which is always visible, the BATT screen shows actual voltage and the radio's operating time. This allows you to determine how long a pack lasts before it has to be recharged or replaced. When battery voltage falls below 9.1, an alarm sounds.

\*Addresses are listed alphabetically in the Index of Manufacturers on page 217. ■

## *Tuning and Modifying the*

# Losi XX4

by Greg Vogel



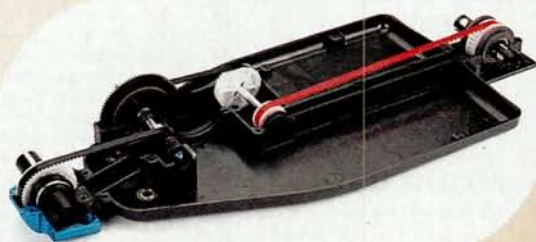
Team Losi's Hot Weather body looks similar to the original except for the large scoop on the front left side. The scoop ducts air to the motor and speedo.



Although formidable in stock trim, there are very few stock components left on this car. Parts were replaced to either increase rigidity or decrease weight.

**M**ost owners of the Losi\* XX4 are more than satisfied with the performance and durability of their buggy in stock form. I, too, am impressed with the four-wheeler's handling and drivability and have put my own XX4 into the winners' circle at plenty of club races. But, of course, any car can be improved by careful tuning, with aftermarket hop-ups, or—my favorite—a combination of the two. I've logged some quality bench time getting my XX4 up to speed; here's what worked for me.

*The Team Losi graphite chassis makes a lightweight foundation for housing the driveline. Look closely and you'll see Hammad Ghuman's lightweight layshaft, Losi's heavy-duty rear belt, Trinity front bulkhead and MIP Lite Drives.*





*Up front, the car is packed with new pieces from Losi, MIP, Trinity and Lunsford. Reducing weight while maintaining rigidity is key to a top-performing racecar.*

## LOTS-O-EXTRAS

### • Chassis and drive train.

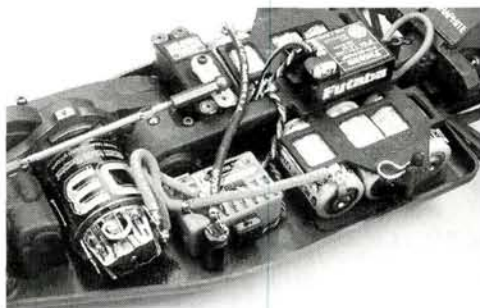
The early XX4 kits included a graphite chassis, and it certainly benefits the car's performance by reducing its weight. But after a full race season and numerous horrific crashes, my car looked a little the worse for wear, so the first item on the "gotta-get" list was a new graphite chassis.

While the car was in pieces, I installed new drive-train components. I added a new 84-tooth Kimbrough\* spur gear to replace the worn original, and replaced the layshafts with light aluminum units from Hammad Ghuman\* (Losi also offers a set of aluminum shafts complete with hardware). Losi's new heavy-duty rear belt (easily identified by its red color) now drives the rear diff, and I replaced the locknuts on the front and rear diffs with Hammad Ghuman alloy diff nuts. MIP\* Lite Drives were also added to the drive train, and these are mated with MIP CVDs; I replaced the front hub bearings with  $\frac{3}{16} \times \frac{3}{8}$ -inch units to accommodate the new drive shafts. The new parts

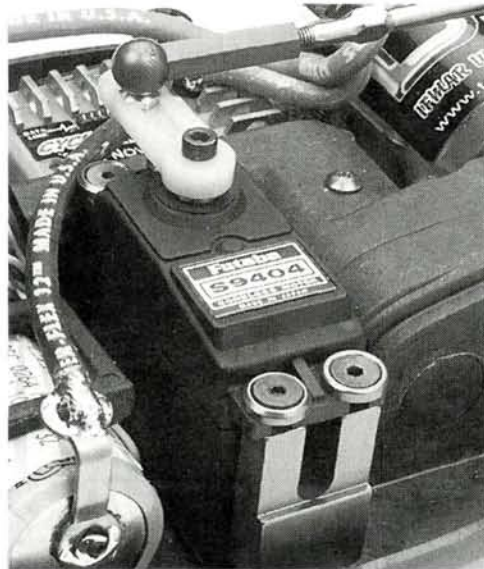


*Worried about stayin' cool? These Trinity heat sinks will not only relieve you of your heat problem, but they will also give your car that extra-trick look.*

rear arms with lighter, stiffer, graphite versions, and Trinity's blue-anodized suspension brace was added for extra security. Lunsford\* titanium hinge pins and titanium tie-rods replaced the stock steel pieces, and the stock camber-



*Right: new electronic gear outfits the car: Novak Cyclone, Futaba servo, Trinity VIS-2000 battery and D3 motor. Below: a Trinity aluminum servo mount replaced the stock plastic piece. Blue concave washers stiffen the support.*



link ball studs were replaced with MIP's B.J. ball studs, which are slightly oversize to reduce slop in the ball ends. The steering ball studs are also B.J.s. To further reduce slop, I added a Losi ball-bearing set to the bellcranks (also available from Trinity).

I replaced the shock towers with graphite units to shave off as much weight as possible. The new towers have been beefed up with extra bracing across the shock mounts. Trinity's blue-anodized shock bushings look great on the towers, as do the Trinity blue aluminum screws that replaced the screws in all low-stress areas.

The shocks were revitalized by a rebuild and by adding new parts, and to improve their look, I added a full set of Losi gold titanium-nitride shafts and new seal cartridges fitted with MIP blue seal O-rings.

# XX4 HOP-UP OPTIONS

## LOSI

### Graphite

chassis—part no. A-9912  
chassis cover set—A-9913  
shock tower (F/R)—A-9740/A-9840  
arms (F/R)—A-9735/A-9802

Titanium-nitride shock shaft (0.6/1.2 in.)  
—A-5060/A-5062

Sealed bearing steering set—A-6914

Hot Weather body—A-8045

Aluminum layshaft—A-9934

Aluminum slipper shaft—A9935

X 2000 tires—A-7369S

Block Head tires—A-7282S

## TRINITY

Ball-bearing steering set—TK3001

Rear suspension brace—TK3009

Front bulkhead—TK3014

Motor spacer—TK3027

Motor-mount clamp—TK3012

Servo mount—TK3025

Monster heat sink—TK3028

Buggy washer—TK3006

Shock bushings—TK3029

Screw kit—TK3062

Locknuts—TK3058

Purple seals—TK3015

Rear swaybar—TK3000

## MIP

Aluminum CVD (F/R)—1305/1302

Lite Drives—1191

B.J. balls (short/long)—1075/1076

Blue seals—1043

Golden shock shafts (0.6/1.2 in.)  
—1050/1052

## HAMMAD GHUMAN

Aluminum slipper shaft—1103

Aluminum layshaft—1104

Hub carriers—2301

Diff nut—1802

## LUNSFORD

Punisher titanium turnbuckle  
and hinge-pin set—PS-66

## KIMBROUGH

84-tooth spur gear—306

• **Electronics.** After the XX4 had been revamped, it was time to give it a new dose of electronic equipment. I suspected that the magnets of last season's motor had gone soft, so I opted for a whole new motor rather than a simple armature replacement. I chose a Trinity D3 13-triple (same wind as the motor I was replacing),

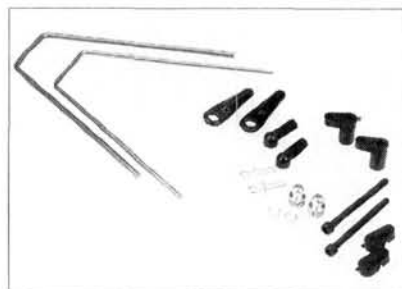


**Hammad Ghuman's well-crafted aluminum hub carriers add precision and strength to the rear end.**

which I bolted onto a Trinity heat-sink motor plate. The blue motor clamp is

another hop-up by Trinity that not only looks great but also helps to dissipate heat—always a plus in an XX4. I soldered in a new Ex-Tech 2000 matched pack to supply maximum power (remember to insulate the batteries and motor from the chassis with electrical tape or decal material; I used some HPI "graphite-look" decal material just because it looked cool). A Novak\* Cyclone takes care of the throttle duties, and a Futaba\* 9304 controls the steering. Futaba's 3PJ transmitter and receiver round out the package.

• Body and tires. Losi's new Hot Weather



**Trinity's swaybar set will help lock your XX4 into any smooth track. The set comes with all the hardware necessary for mounting and with two bars for fine-tuning.**

## Merrillville Parks & Recreation Dept. and R/C MANIA present: 1998 Itty-Bitty Mini 500 Parking Lot Race July 24-26

**Schedule:** Friday 6:00 pm Dinner & Dance  
Saturday 9:00 am Open Practice  
10:45am Mandatory Drivers Meeting  
11:00 am 1st of 3 qualifiers  
Sunday 9:30 am 4th qualifier/Mains

**Classes:** **Electric:** 4wd Touring mod., stock (Roar Stock Motor-24 Deg.), Truck mod., Stock, Dual Sport Mod.  
**Gas:** 4wd Touring car stock (kit engines no tuned pipes), Mod. any .12 engine tuned pipes OK., 1/8 scale gas Touring/rally car, based on off-road chassis w/rally body., Gas dual sport, kit bodies only. All gas vehicles must be equipped with throttle return springs.

**Entries include:** T-shirt and dinner ticket  
**Entry must be received by July 1, 1998.**

**Mail completed entry form with payment to:**  
**Merrillville Parks & Recreation Department**  
**5750 Tyler Place, Merrillville, IN 46410**

### 1998 Itty-Bitty Mini 500 Entry Form

**Name:** \_\_\_\_\_ **Shirt Size:** \_\_\_\_\_ **Total:** \_\_\_\_\_  
**Address:** \_\_\_\_\_ **\*\$10.00 off each**  
**City:** \_\_\_\_\_ **St:** \_\_\_\_\_ **Zip:** \_\_\_\_\_ **additional Class**

Category	Channel		
___ 1/10 Touring Car Mod	1	2	3 \$30.00
___ 1/10 Touring Car Stock	1	2	3 \$30.00
___ 1/10 Touring Car Gas-St.	1	2	3 \$30.00
___ 1/10 Touring Car Gas Mod	1	2	3 \$30.00
___ 1/10 Truck Mod	1	2	3 \$30.00
___ 1/8 Gas Touring/Rally	1	2	3 \$30.00
___ Dual Sport Mod	1	2	3 \$30.00
___ Dual Sport Gas	1	2	3 \$30.00

For More INFORMATION:

**Race,** please call Ron @ (219)762-5365 or 996-6288  
**Activities,** please call Merrillville Parks @ (219)980-5911  
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body greatly improves airflow through the car during those treacherous summers when our equipment really roasts. New Losi Silver X 2000s were mounted in the rear, while Silver Block Heads were mounted up front.

### PERFORMANCE

After driving the stock XX4 in quite a few races, I could hardly wait to try the new full-option buggy. With only a few laps clocked, I was already impressed by the XX4's new attitude on the track. I noticed a slight increase in acceleration on the straights and when exiting the corners; the lightened drive system really makes a difference. I noticed that the buggy was slightly more responsive to my commands.

With its stiffer suspension components and no-slop linkages, the XX4 made sure that all my steering and throttle inputs made their way to the tires' contact patches undiluted.

My tire choice was a little off for the conditions of the day, however, so I changed to Losi's IFMAR pins like the stock meats. After the change, the traction action was in full force; the buggy glided through turns and felt well planted. Thanks to the Trinity motor and battery combo, the XX4 was flyin' with style and putting down some fast lap times. I noticed slight, but significant, performance increases, but the real benefits of the changes I made come in the form of durability and setup longevity, not in single-lap performance. My hopped-up XX4 now runs cooler, and that helps the motor stay punchy, and it is less likely to break with the newer, stronger graphite parts in place. As you probably know, there's nothing slower than a broken car!

\*Addresses are listed alphabetically in the Index of Manufacturers on page 217. ■

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Plano, TX	(972) 758-7875
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## CACTUS CLASSIC

(Continued from page 99)

• A2. Scott Hughes got in front of top qualifier Jim Gard to take the lead early on, while Matt Francis, Brian Kinwald and Lloyd Dassonville followed closely behind. Kinwald managed to get past Francis and Dassonville to claim third, and the race continued in the same order all the way to the end. This was perhaps the most uneventful heat all weekend.

• A3. Brian Kinwald was once again tied with Jim Gard for the lead, but Scott Hughes was well within striking distance and needed a win to clinch the championship. Gard once again stormed out in front, with Hughes and Matt Francis on his tail. Coming out of one of the corners, Hughes made a successful inside pass on Gard and found nothing but open space in front of his car. Moments later, Hughes rolled over and Gard was once again in the lead, but Hughes quickly recovered and regained the lead only moments later after he had unintentionally T-boned Gard's car when landing off a jump. Suddenly, Matt Francis moved up to second while Gard dropped back to third, just in front of Rick Hohwart. Meanwhile, Kinwald struggled to find a line until his car broke on the ninth lap; this took him out of contention. Tavakoli made the limelight when his Double-X assumed third in front of Gard, but his moment of glory was short lived. Soon, Gard was back in third, while Francis made a beautiful pass on Hughes to take the lead. With less than a minute remaining, Hughes regained the lead from Francis and didn't budge from that point on. Hughes managed to cross the line less than a second in front of Francis to take the win and the championship. Francis rolled in to take second, while Gard had to settle for third. After the points had been tallied, Hughes was declared champion. Kinwald and Gard tied with 198 points each, but when their throw-out rounds were factored in, Gard ended up in second, and Kinwald had to settle for third.

## FINAL THOUGHTS

The Twelfth Annual Cactus Classic was a great success. Local Scottsdale, AZ, drivers had the opportunity to share the drivers' stand with some of the best drivers on the planet (and they even beat some of them). The folks at Scottsdale R/C Speedway did a fantastic job hosting the event. The track was consistent, the hobby shop was well stocked, there was plenty of barbecue to eat, and the bathrooms were actually clean—something that's occasionally overlooked at some tracks. We thank Pro-Line for their gracious sponsorship and congratulate all the winners and local heroes who attended. See you at the races; maybe your smiling face will show up in the viewfinder of my Nikon.

\*Addresses are listed alphabetically in the Index of Manufacturers on page 217.

# Track Directory

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## YOUR 1998 TRACK GUIDE

### Key to Symbols

- Indoor
- Outdoor
- Off-road
- Oval
- Dirt oval
- Carpet
- Concrete
- Asphalt
- On-site hobby shop
- AC power
- Auto lap-counting
- Food available

### CONNECTICUT

East Lyme R/C Kar Klub, Society Rd., East Lyme, CT 06333; (860) 442-4343

K/N R/C Speedway Inc., West St., Stafford Springs, CT 06086; (860) 684-9896

Racing and Entertainment Center, 29 Olcott St., Manchester, CT 06040; Peter Tierini, (860) 646-4768

R/C Madness, 640 Enfield St., P.O. Box 64, Enfield, CT 06082; Christopher Marcy, (860) 741-6501

Xtreme Radio Control, 469 Danbury Rd., New Milford, CT 06776; Paul or Pete, (860) 354-4703

### DELAWARE

DARCAR Club, Blue Hen Corporate Center, Rte. 113, Dover, DE, 19901 Steve, (302) 697-8350.

Eastcoast Off-Road, Rt. 3 Box 256 A, Laurel, DE 19956; Darrin Shockley or Steve Nelson, (302) 875-8160

The Hobby Outlet: Tracks of the Outlet, Salisbury Rd., Dover, DE 19901; Steve, (302) 697-8350

Hobby Stop Speedway, RD4, Box 100, Rte. 13, Seaford, DE 19973; Remy Haynes, Jr., (302) 629-3944

### FLORIDA

B+T R/C Central, 811 Playground Rd., Ft. Walton Beach, FL 32547; (904) 863-1666

Branford R/C Speedway, Rt. 3, Box 240, Branford, FL 32008; (904) 935-0758

### ALABAMA

Beacon Point RC Raceway, 15717 Beacon Point Drive, Tuscaloosa, AL, 35406; Don, (205) 333-8679

Hobbytown USA Raceway, 450-Q Schillinger Rd. N., Mobile, AL 36608; Rob & Kari Baker, (334) 633-8446

Lagoon Park R/C Raceway, 2730 Lagoon Park Dr., Montgomery, AL 36109; Alex Love, (334) 272-6438

Phenix Raceway & Hobby, 2006 Opelika Rd., Phenix City, AL 36867; Chris Watson, (334) 298-9786

R/C Hi-Tech Raceway, 3303 Meridian St., Huntsville, AL 35811; Rick Chambers, (205) 539-1347

R/C Thunder Tracks, 1530 Schillinger Rd., Mobile, AL 36675; Jerry Hurst, (334) 645-2787

### ALASKA

Fairbanks R/C Car Club 510 Janae Ave. Fairbanks, AK 99701; Dan Anderson, (907) 456-5494

### ARIZONA

Cottonwood R/C, S. 6th St., Cottonwood, AZ 86322; Sal Cirincione, (520) 567-6830

Havas R/C Raceway, 1400 S. Smoketree (Rotary Park), Lake Havasu, AZ 86403; Jeff Roe, (520) 855-2226

HobbyTown Mountain Raceway, 1500 E. Cedar Ave., Cedar Hills Shopping Center, Flagstaff, AZ 86004; Richard, (520) 214-9887

HobbyTown Raceway, 13802 N. Scottsdale Rd., Scottsdale, AZ 85250; (602) 948-3946

HobbyTown Raceway, 1915 East Baseline Rd., Gilbert, AZ 95234; Dennis, (602) 892-0405

Hobbytown Raceway, 1102 E. 22nd St., Tucson, AZ 85704; (520) 882-8888

HobbyTown U.S.A., 5030 E. Ray Rd., Phoenix, AZ 85044; Linda McFarland, (602) 598-5282

Quarter Flash's Squirtin' Dirt Raceway, 16301 S. Santa Rita #C, Sahuarita, AZ 85629; Dave, (520) 925-9274

R/C Sports Mania, 3550 N. 35th Ave., Phoenix, AZ 85017; Brian Dick, (602) 278-3671

Scottsdale R/C Raceway, 3023 N. Scottsdale, Scottsdale, AZ 85251; Scott Anfinson, (602) 945-2186

Speedway Hobbies, 2710 N. Steve's Blvd., Ste. 8, Flagstaff, AZ 86004; Gary McAllister, (520) 714-1566

Thunder Mountain R/C, 1325B Plaza Mavia, Sierra Vista, AZ 85635

USA Speedway, 5947 W. Alameda, Glendale, AZ 85310; Michael Fleek, (602) 516-1398

### ARKANSAS

Arkansas R/C Car Association, 101 W. 52nd St., N. Little Rock, AR 72118; William Byrd, (501) 753-1286

Airport Speedway, 1521 Airport Loop, Rogers, AR 72756; Mike Dollar, (501) 636-7123

Grand Slam Superspeedway, 5300 S. Zero St., Ft. Smith, AR 72901; Bryon Shumate, (501) 648-1994

Hobby Town USA, 356 E. Joyce, Fayetteville, AR 72703; Darrell Irvin, (501) 571-3730

Sparks R/C Raceway, 7194 Greene 721 Rd., Paragould, AR 72450; Tommy Sparks, (501) 239-3606

### CALIFORNIA

California City R/C Car Track, 8349 Jacaranda Ave., California City, CA 93505; (760) 373-3765

Cameron Park Raceway, 1305 Cameron Ave., West Covina, CA 91790; Carl A. McVey, (818) 962-1120

Cats West/Hawk's R/C Raceway, 1201 West 10th St., Antioch, CA 94509; Mike Rogers, (510) 779-1665

Cycle Art Raceway, 2211 N. Pleasant Way, Fresno, CA 93705; Jesse Shapiro, (209) 233-3665

Discount Hobby Warehouse, 7750 Convoy Ct., San Diego, CA 92111; (619) 560-9633

Freedom Park Raceway/Ventura Roadrunners, Freedom Park Dr., Camarillo, CA 93010; Chris Jones (805) 656-RACE

Greater Los Angeles R/C Racing Club, 3756 Cardiff Ave., #305, Los Angeles, CA 90034; Nikko Ko

Hobby Central Raceway, 34255 P.C.H., Unit 107, Dana Point, CA 92629; John, (619) 513-0373

Hobby Central II Raceway, 13461 Community Road; Poway, CA 92064; John, (619) 513-0373

Hobby Paradise Raceway, 1880 Art Gonzales Pkwy., Selma, CA 93662; Steve Keiser, (209) 896-4804

HobbyTown, Parktown Plaza Shopping Center, 1350 S. Park Victoria Dr. #21, Milpitas, CA 95035; (408) 945-6524

Hobby Warehouse, 8950 Osage, Sacramento, CA 95828; Roger Hubbard, (916) 381-7587

Hot Rod Hobbies, 25845 San Fernando Rd., #21, Saugus, CA 91350; Rod Weisbaum, (805) 255-2404

Jake's Performance Hobbies, 6650 Commerce Blvd. #21, Rohnert Park, CA 94928; Jake, (707) 586-3375

Just for Fun R/C Raceway, 509 S. State St., Ukiah, CA 95482; Don, (707) 462-7305

K&M Raceway, 22474-A Barton Rd., Grand Terrace, CA 92313; (909) 783-0899

Lake Tahoe Raceway/Sierra Hobbies & Raceway, P.O. Box 9969, South Lake Tahoe, CA 96158; Mark Osser or Greg Smith, (916) 541-4555

Loki Raceway & Hobbies, 1875 Joe Crossen Dr. #B, El Cajon, CA 92020; Ed Mullen, (619) 562-7757

Lucerne Valley Raceway, 32800 Old Woman Springs Rd. #4, P.O. Box 2047, Lucerne Valley, CA 92356; Frank Rodriguez, (760) 248-7305

M n M Hobbies, 4225 Prado Rd., Ste. 103, Corona, CA 91720; Joe Stanovich, (909) 272-3545

M.R.C.A.R., McGreed Loop, Merced Airport, Merced, CA 95340; (209) 723-6662

Nor-Cal Mini-Speedway, 519 Bush St., Woodland, CA 95695; Steve Van Atta, (916) 668-5678

Perris Recreation R/C Track, 120 N. Perris Blvd., Perris, CA 92370; (909) 943-6603

R/C Racing Center and Hobbies, 9842 Channel Rd., Lakeside, CA 92040 (San Diego County); Russ or Cindy Escalera, (619) 443-2270

R/C Velodrome, P.O. Box 2403, Julian, CA 92036; Peyton Read, (760) 765-3463

R.A.C.E., 724 Mangrove Ave., Chico, CA 95926; HobbyTown U.S.A., (916) 899-2977

Race Corner of Marin, 14 Commercial Blvd., #111, Novato, CA 94949; Mike, (415) 883-0388

Race Prep Raceway, 20115 Nordhoff, Chatsworth, CA 91311; Steve Dunn, (818) 709-6800

Racer's Haven Raceway, 7401 White Lane #12, Bakersfield, CA 93309; Martin Buchanan (805) 835-0441

Radio Control Products, 201 E. Magnolia Blvd. #148, Burbank, CA 91502; Tab, (815) 846-4208

Rams 1/8-scale Gas and 1/10 scale Gas On-Road, Mission College, Lot B, 3000 Mission College Blvd., Santa Clara, CA 95054-1897; Steve Tsuruda, (416) 675-5609

Ranch Pit Shop, 1655 E. Mission Blvd., Pomona, CA 91766; Ken Shintani, (909) 623-1506

Ripon R/C Speedway, 701 N. Acadia Ave., Ripon, CA 95366; Dan Tanis, (209) 599-5160

R.O.C.K.S., 2525 N. Texas St., Fairfield, CA 94533; Mike Learn, (707) 447-0492

Simi Valley Groundpounders, 205 Tierra Rejada Rd. (behind Simi Valley Drive-In), Simi Valley, CA 93065; Jack Kasten, (805) 584-8211

So. Cal R/C Raceway, 19118 Brookhurst St., Huntington Beach, CA 92646; Jim Blauvelt, (714) 963-7484

S.R.S. Offroad Raceway, 1038A N. Davis Rd., Salinas, CA 93907; Randy Loveless, (408) 424-4044

Team Air Racing Club, 18208 Imperial Hwy., Yorba Linda, CA 92686; Don or Nicky, (714) 579-7488

Track Heaven, 6196 Child's Ave, San Diego, CA 92139; Loure, 475-2020

Tri-Valley Auto Racers, Livermore Elks Club, 940 Larkspur, Livermore, CA 94550; Mike Stone, (510) 455-6833

Ultimate Hobbies, 2143 N. Tunstun Ave. #6, Orange, CA 92665; Cliff Murukami, (714) 921-0424

Valley R/C Racepark, 146 S. Santa Fe St., Hemet, CA 92344; Valley Wide Recreation, (909) 925-9331 or (909) 654-1505.

### COLORADO

MHOR R/C Raceway, 15540 East Batavia Dr., Aurora, CO 80011; Jess Brockman, (303) 343-0151

S&T R/C Raceway, 323 Auburn Dr., Colorado Springs, CO 80909; Tim Bishop, (719) 574-2910

Valley West R/C Club, 2202 I Road, Grand Junction, CO 81505; Raymond Williams, (970) 242-8846

**Broward County R/C Race Club**, Mills Pond Park, Ft. Lauderdale, FL; Ed Decemberto, (954) 525-3304

**Coral Springs Roadrunners**, P.O. Box 9632, Coral Springs, FL 33075; John Argenteo, (954) 925-8284

**First Coast Speedway**, 6410 Waltho Dr., Jacksonville, FL 32211; Bob Thompson, (904) 743-2161

**5-Fifty-5 R/C Raceway**, State Road 555, Bartow, FL 33830; John Goepferich, (941) 678-9111

**Frontier Race Track**, 15260 N.E. 244th Ave., Salt Springs, FL 32134; Harold Reel, (352) 685-2881

**G & C Hobbies**, 1228 Hypoluxo Rd., Lantana, FL 33462; George, Debbie, or Carol, (561) 547-3812

**Gainesville R/C Speedway**, P.O. Box 693, Melrose, FL 32666; 130 NW 14th Ave., Gainesville, FL 32601; (352) 495-3600

**Greater Orlando Auto Racers**, 970 Keller Rd., Altamonte Springs, FL 32714; Dave Mottin

**Hobby World Raceway**, 7273 103rd St., Jacksonville, FL 32210; Greg, (904) 772-9022

**The Hobby Stop Raceway**, 5765 Manatee Ave. W., Bradenton, FL 34209; Rich Konnen, (941) 798-9638

**The Hobby Stop Raceway**, 2454 Land O'Lakes Blvd., Land O'Lakes, FL 34639; Rich Konnen, (813) 948-0606

**Miami R/C Raceway**, 12546 S.W. 88 St., Miami, FL, 33186

**Minnreg R.C. Club**, 6340 126th Ave. N., Clearwater, FL 34624; David Fox, (813) 787-6032

**Monster Hobbies**, 231 SE 1st Ave. Boca Raton, FL 33432; Steve Augustus, (561) 392-5447

**Morris Kohl's Raceway and Hobby Shop**, 1202 W. Waters Ave., Tampa, FL 33604; Morris Kohl, (813) 931-1626

**My Rose**, 1695 W. Indiantown Rd., Jupiter, FL 33458; Mark Watson, (561) 744-3800

**NORRA**, 3300 Santa Barbara Blvd., Naples, FL 33999; Jerry Pecar, (941) 455-9065 or Mark Benfield, (941) 263-6861

**Ocala Radio Control Car Club**, 3500 SE 30th Terrace, Ocala, FL 34471; Steve Shook, (352) 694-5147

**Paradise Speedway**, Mile Marker 98.5 U.S. 1, P.O. Box 738, Key Largo, FL, 33037; Joe Ravard, (305) 451-3707

**Paul's Stadium Raceway**, 4511 W. Dr. M.L. King Jr. Blvd., Tampa, FL 33614; Paul Surette, (813) 872-8662

**PBG R/C Motor Park**, 6351 Barbara St., Palm Beach Gardens, FL 33418; Doug Gleason, (561) 743-9791 or Tim Case, (561) 627-2608

**Pro Hobbies Speedway**, 715 N. Lake Pleasant Rd., Apopka, FL 32712; (407) 886-4615

**Port St. Lucie Racing**, 3626 SW Rivera St., Port St. Lucie, FL 34953; Frank Spadavecchia, (561) 336-8711

**River City R/C Car Club**, 9711 Sharing Cross Dr., Jacksonville, FL 32257; Bill Fraden, (904) 268-1948

**Sarasota RC Speedway**, 8475 Cooper Creek Blvd., University Park, FL 34201; Jim Wilson, (941) 358-7047

**South Daytona R/C Raceway**, 2121 S. Ridgewood Ave., South Daytona, FL 32119; Mike Bean, (904) 426-6481

**South Palm Beach Racers**, South County Regional Park, West Boca Raton, FL 33486; Mike Fazio, (561) 338-5367

**Superior Hobbies R/C Parking Lot Racing**, 430 E. Hwy. 436, Ste. #106, Casselberry, FL 32707; Rob Michael, (407) 834-9299

**Tallahassee R.C. Raceway**, Tom Brown Park, Eastwood Dr., Tallahassee, FL 32311; Roland Costine, (904) 671-2814

**Tampa Bay R/C Club**, P.O. Box 10224, St. Petersburg, FL 33733; Dick Gillette, (813) 526-0744

**Tampa Hobbystown R/C 4 Slot Car Raceway**, 15702 N. Dale Mabry, Tampa, FL 33618; Max and Judy Rosenroth, (813) 968-7233

**Winterset Raceway**, U.S. Rt. 27 South, Winterset Motel, Sebring, FL 33872; John Bisbee or Mac Mixer, (941) 699-1140 or (941) 385-4448

## GEORGIA

**Dalton Raceway**, 2300 Chattahoochee Rd., Dalton, GA 30720; (404) 226-6699

**Echeconnee Superspeedway**, 2149 Richardson Dr., Macon, GA 31206; Andy Thompson or Cliff Kline, (912) 788-8731

**Emerald City R.C. Speedway**, Highway 40 East, East Dublin, GA, 31021; Terry Cook, (912) 272-3856

**Hobby Town Raceway**, 2301 Airport Thruway, Columbus, GA 31904; Frank Bastos, (706) 660-1793

**HobbyTown Raceway**, 225-B Tom Hill, Sr. Blvd., Macon, GA 31210; Marcus Lee, (912) 474-0061

**Lake Mayer Raceway**, 1430 Dale Dr., Savannah, GA 31406; (912) 598-9709

**The Racer's Edge**, 1530 Hwy. 19 N., Thomaston, GA 30286; Roger or Mark Walls

**Sandy Cross Speedway**, Rt. 1, Box 1071, Hwy. 51, Royston, GA 30662; Morris Phillips or Wayne Fowler, (706) 245-9573

**SHILOH R/C Raceway**, 6362 Shiloh Rd., Hahira, GA 31632; Doug Burnett, (912) 794-2507

**Silver Wings Raceway**, 5611 Riverdale Rd., College Park, GA 30349; M. Bradshaw, (770) 991-2225

**Stinger RC Super Speedway**, 3769 Maysville, Rd., Commerce, GA 30529; Deric Sauls, (706) 335-5006 or (706) 335-9044

**Sugar Bowl R/C Speedway**, 5272 Nelson Brogdon Blvd., Sugar Hill, GA 30518; Shelley Bailey, (770) 945-6709

**Valdosta Hobbies**, 3998 Inner Perimeter Rd., Valdosta, GA 31602; Ron Hood, (912) 244-2101

## HAWAII

**Garden Isle R/C Racers**, 5855 Ahaka St., Kapaa, Kauai, HI 96746; Arnold Morales, (808) 823-0856

**Kakaako Water Front Park Dragway**, 98-029 Hekaha St., Bay #32, Alea, HI 96701; James Inkyo, (808) 487-5155

**Keelhi Lagoon Park**, Leeward Community College, Waipahu, HI 96797; (808) 676-5486

**Maui R/C Racing Association**, 430 Hookahi St., #13, Wailuku, HI 96793; Tritech R/C Hobbies, Radio Control Association, (808) 244-0526

**Pearl City Raceway**, 98-029 Hekaha St., Bay 32, Alea, HI 96701; James Inkyo, (808) 487-5155

**Radio Control Hawaii**, 474 Kalanikoa St., S-104, Hilo, HI 96720; Glenn Shiroma, (808) 935-5629

**Team PRC Racing Club**, 176 Mamo St., Hilo, HI 96720; Charlie Kawamoto, (808) 935-3561

## IDAHO

**Capital Dirt Burners**, 301 N. Bruce, Boise, ID 83712; Mike Ard, (208) 345-3906

**Dirt Stuff Plus**, 5344 N. Yellowstone Hwy., Idaho Falls, ID 83401; Brian Krahn, (208) 522-7576

## ILLINOIS

**Adam's R/C Raceway**, 7201 S. Adams Bartonville, IL 61607; Ray Tique, (309) 633-9300

**AJ's Raceway & Hobby**, 10211 Kesling Road, Dekalb, IL 60115; A.J. Schultz, (815) 756-2772

**C.I.R.C.A.**, 905 Bibbs St., Jacksonville, IL 62650; Sport 'n' Hobby, (217) 245-1375

**C&R Hobbies**, 39 E. Jones, Milford, IL 60953; Ray Craighead, (815) 889-4073

**Dan's Hobby World**, 18415 S. Halsted St., Glenwood, IL 60425; Dan, Bruce or Josh, (708) 754-7988

**Gary's R/C Speedway**, 1712 East Grove, Rantoul, IL 61866; Gary Dale Fleisher, (217) 893-9297

**Glenwood Roseway**, 18417 Halsted, Glenwood, IL 60425; Don's Hobby World, (708) 754-7988

**G&R Raceway & Hobbies**, 533 Bank Lane, Highwood, IL 60040; Randy Rose, (847) 432-9600

**HobbyTown Raceway**, 9346 Virginia Rd., Lake in the Hills, IL 60102; Mike Hollingsworth, (847) 458-1777

**HobbyTown Raceway**, 2103 N. Veterans Pkwy., Bloomington, IL 61701; Gary Pritts, (309) 664-4451

**Leisure Hours R/C Raceway**, 24121 W. Theodore, Bldg. 1, Plainfield, IL 60544; Scott Hill, (815) 439-1777 (track), (815) 439-1477 (shop)

**Machesney Park**, 1220 Shappert Dr., Machesney Park, IL 61115; (815) 282-1311

**Marty's R/C Hobby**, 1335 E. Broadway, Bradley, IL 60915; Gail or Marty, (815) 933-8441

**Miley Motor Speedway**, 1109 N. Bloomington St., Ste. 23, Streator, IL 61364; Doug, (815) 672-4212

**Monee R/C Raceway**, 26049 Ridgeland Ave., Monee, IL 60449; Roy or Roberta Moody, (708) 534-2422 (track), (708) 799-5597 (office)

**Pontoon Raceway**, 3670 St., Rte. 111 Granite City, IL 62040-4304; Pat or Skip, (618) 931-1206

**Outlaw R/C Speedway**, 1614 Broadway, Mattoon, IL 61938; (217) 234-6229

**R/C Workshop**, 3100 S.W. Adams St., Peoria, IL 61605; Al Kretz, (309) 673-4860

**Radio-Active Raceway**, 751 N. Bolingbrook Dr., #15, Bolingbrook, IL 60440; Jim, (630) 759-7557

**Rector's R/C Raceway**, RR 3, Box 104, Albion, IL 62806; Tim Wolfe, (618) 842-9379 (M-F), (618) 446-3282 (Sun.)

**Shiloh Eagles Superspeedway**, 308 N. Virginia Ave., Belleville, IL 62220; (618) 277-6030

**SIRCAR Raceway**, 1200 N. Marion, Carbondale, IL 62901; (618) 549-5885

**Stanton Hobby Shop**, 4718 N. Milwaukee, Chicago, IL 60630; Kevin Kane, (773) 283-6446

**Valley Farms R/C Raceway**, 706 Bypass 20, Cherry Valley, IL 61016; Dean or Debbie, (815) 332-4516 or (815) 547-5984

**Wep Speedway**, RR #2, Box 44 Lawrenceville, IL 62439; Bill Poe

## INDIANA

**Bremen Racing Ent.**, 308 N. Bowen, Bremen, IN 46506; Dale Heuberger, (219) 546-3807

**Dirt Slinger's Raceway**, 546 North 12th Ave., Beech Grove, IN 46107; Phil Riley, (317) 787-3815

**Elliott's R/C Raceway**, 2140 North Plate, Kokomo, IN 46901; (765) 452-0163

**G.R.C.C.C. Inc.**, 1651 W. Franklin St., Elkhart, IN 46516; Peter Russell, (219) 293-1827

**Hardesty R/C Raceway**, 11 East Plymouth St., Hamlet, IN 46533; Max Hardesty, (219) 867-8600

**Hobby Barn Raceway**, 1950 Springhill, Terre Haute, IN 47802-9694; (812) 299-5773

**Hobbytown U.S.A.**, 5385 E. 82nd St., Indianapolis, IN 46250; Bill Scott, (317) 845-4106

**Kokomo Hobby & Radio Raceway**, 1108 E. Markland, Kokomo, IN 46901; (765) 457-5060

**P&T Hobbies and Raceway**, RR 2 (Hwy. 60), Mitchell, IN 47446; Paul Webber or Tom Logsdon, (812) 849-6666; email: pnthobby@kiva.net

**Race Street Hobbies**, 1126 1/2 Race St. New Castle, IN 47362; Jim Burke, (765) 521-4888

**RC Barn**, 310 N 125 W, Monroe, IN 46772; Mark Lengerich, (219) 692-6600

**R.C.R.C. Raceway of Salina**, 1300 E. Crawford, Bill Burke Park, Salina, KS 67401; Calvin Calp, (913) 823-9588

**R/C World of Indiana**, 2246 West U.S. Hwy. 36, Lynn, IN 47355; Joe Kolp, (765) 874-2464; e-mail: rcworld@globallink.net

**R/C Mania**, 8 Wood Ct., Hebron, IN 46341; Ron Trobaugh, (219) 996-6288 (shop); (219) 762-5365

**The Rink**, 7900 Whitcomb, Merrillville, IN 46410; Don Reiner, (219) 769-8113

**Rod's Off-Road R/C Track**, 800 N. Division, Bristol, IN 46507; Rod Harms, (219) 848-7848

## IOWA

**Delb's Speedway**, 423 11th Ave. So., Clinton, IA 52732; Rusti's Miniatures and Hobbies, (319) 243-2697

**Dubuque R/C Speedway**, Dubuque County Fairgrounds, Dubuque, IA 52001; Paul Conlon, (319) 556-2736

**Hobby Haven**, 7672 Hickman Rd., Des Moines, IA 50322; Rick Marble, (515) 276-8785

**Inside Challenge**, 2028 Main St., Keokuk, IA 52632; Jessie, (319) 524-2225

**Iowa City R/C Racing Association**, 1700 First Avenue, Iowa City, IA 52240; Hobby Corner, (319) 338-1788; fax (319) 354-6105

**IROAR—Hawkeye Downs Raceway**, Hawkeye Downs, 6th St. S.W., Cedar Rapids, IA 52404; Dave Kleinschrodt, (319) 556-8524

**Manly R/C Club**, Box 23 (Hwy. 65), Manly, IA 50456; Bruce Hill, (515) 454-2025

**Marble's Raceway**, 4685 SE 40 St., Des Moines, IA 50317; Rick Marble, (515) 262-7507

**Mr. Car Raceway**, P.O. Box 1112, Central Iowa Fairgrounds, Marshalltown, IA 50158; Jim Gossett, (515) 483-2234

**Outback Speedway**, 403 State St., Guthrie Center, IA 50115; Helens Enterprises, (515) 747-3064

**Radio Control Raceway Park**, 2100 First Ave. N., Fort Dodge, IA 50501; Bernie Halverson, (515) 376-3780

**Riverside Raceway**, Veteran's Park, Algona, IA 50511; Mike Beisch, (515) 295-9352

**Shentona Speedway**, 1215 W. Lowell, Shenandoah, IA 51601; Doug Cross, (712) 246-5984

**Wild Bill's Raceway**, 901 W. Jones, Knoxville, IA 50138; William Anderson, Jr, (515) 842-5973

## KANSAS

**Hobbytown USA**, 2016 W. 23rd, Lawrence, KS 66046; Kevin Decemberto, (913) 865-0883


**Mike's R/C Hobbies**, 121 SE 29th St., Unit #3, Topeka, KS 66605; Mike Barnard, (913) 266-5767


**Ottawa Outlaw Raceway**, 114 South Main, Ottawa, KS 66067; Tom Wilson, (913) 242-1450


**R/C World Raceway**, 217 Brownie Ave., Scranton, KS 66537; John and Kyle, (913) 793-2313

**RCRC Raceway**, 507 N. 4th, Atwood, KS 67730; Bob Dunker, (913) 626-3261  


## KENTUCKY

**Bourbon City Raceway**, 213 West Stephen Foster Ave., Bardonia, KY 40004; Ryan Barnes, (502) 349-0069  


**Johnny's Speedway**, 3114 North St., Lloyd Greenup, KY 41144; Charles, (606) 473-0075  


**Pit Stop Hobbies**, 106 A Street, Benton, KY 42025; Robert Fitzgerald, (502) 527-8216  


**Rick's Hobby Farm**, 2089 Park Rd., Hawesville, KY 42348; Rick Early, (502) 927-8527  



**Trio Hobbies & R/C**, 216 Redmar Plaza, Radcliff, KY 40160; Maurice Johnson, (502) 351-7547  


## LOUISIANA

**Al's R/C Store**, 1529 Anita, Sulphur, LA 70663; Al Gaspard, (318) 625-5880 or (318) 437-8545  


**Baton Rouge Velodrome**, 7122 Perkins Rd., Baton Rouge, LA 70815; Weldon Sharon, (504) 665-5616; open Sunday 10-4  


**Indy Speedway & Hobby**, 3753 General DeGaulle Dr., New Orleans, LA 70131; Vince Sheetz, (504) 367-1891  


**Pontchartrain Hobby Shop**, 3755 Pontchartrain Dr., Slidell, LA 70458; (504) 649-1199  



## MAINE


**Clay Bowl R/C Hobbies**, P.O. Box 61, Greene, ME 04236; Pat Cap, (207) 946-5003  


**R/C Speedway & Hobbies**, 87 Main St., Fairfield, ME 04963; David Prescott, (207) 453-4588  


## MARYLAND

**Cockeysville Astrodome Racers**, 10854 York Rd. (rear), Cockeysville, MD 21030; Steve Balaz, (410) 666-2521  


**Countryside Raceway (portable)**, 406 Pamela Rd., Apt. C, Glen Burnie, MD 21061; M&J's Promotional Entertainment, (410) 761-6196  


**Doug's Raceway**, 2935 Crain Hwy., Waldorf, MD 20601; Doug Moran, Jr., (301) 843-6220  


**Dusty Downs**, 4665 Bethlehem Rd., Preston, MD 21655; Frank Show, (410) 673-2191  


**Hobby Town USA**, 8223-11 Elliot Rd., Easton, MD 21601; Bill Dyke, (410) 820-9308  


**J.R.'s Race Place**, 2935 Crain Hwy., Waldorf, MD 20601; James Radford, (410) 947-2766  


**The Track**, 16806 Oakmont Ave., Gaithersburg, MD 20877; Mimi Wong, (301) 417-9630  


## MASSACHUSETTS


**C&C Hobby & Raceway**, 562 Russells Mills Rd., So. Dartmouth, MA 02748; Charlie, (508) 997-4131  


**Hi-Tech Hobbies**, 1681 Broadway (Rt. 138), Raynham, MA 02767; Ruben, (508) 880-5373  


**Megadrome Raceway**, Rt. 8 Curran Hwy, North Adams, MA 01247; Bob Blanchette, (413) 743-7223  



**Northboro Speedway**, 168 Main St., Rte. 20, Northboro, MA 01532; Bob Trimble, (508) 393-8087  


## MICHIGAN

**Down River R/C Association/Riders**, 1519 Oak St., Wyandotte, MI 48192; Bobby Santoro, (313) 287-7405  


**Freedom Hill R/C Raceway**, 29330 Coolidge, Roseville, MI 48066; Curley Grewe, (810) 776-5483  


**Hobby Hub**, 5859 M99, Diamondale, MI 48821; Verne Goebble, (517) 337-9278 or (517) 351-5843  


**House of Hobbies**, 2863 West Shore Dr., Holland, MI 49424; (616) 786-3686  


**JT Superspeedway**, W. Golden Ave., Battle Creek, MI 49015; Jerry or Sam, (616) 965-0116  


**Larry's Performance R/C's**, 43665 Utica Rd., Sterling Heights, MI 48310; Larry, (810) 997-4840  

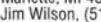

**MCRC Raceway**, 4601 Page Ave., Michigan Center, MI 49203; Sam Sprang, (517) 787-9161  


**Northwest Michigan R/C Club** 744 Munson Ave., Traverse City, MI 49686; Jim Ovaatt, (616) 947-6670  


**Raw Roots Race Tracks**, 8916 Pine Lake Place, West Olive, MI 49460; Roy Bennick (616) 399-9338, or Larry Welsh, (616) 786-2401  


**R&L Hobbies & Racing**, 9782 Portage Rd., Kalamazoo, MI 49002; Rex Simpson, (616) 323-3686; fax (616) 329-1744  


**Rodgers R/C Raceway**, 7463 Ridge Rd., Britton, MI 49229; George Rodgers, (517) 451-8301  


**Thumb Raceway**, 3441 Main St., Marlette, MI 48453; Jim Wilson, (517) 635-7848  


**USA Raceways**, 6083 Dixie Hwy., Bridgeport, MI 48722; Dave Killingsworth, (517) 777-7054  


**Vicksburg Off-Road R/C Raceway**, 50201 Silver St., Vicksburg, MI 49097; Tim, (616) 323-7963  


**Village Hobbies-n-Crafts**, 195 N. Elm, Hesperia, MI 49421; Alan or Fran, (616) 854-1374  


**Village R/C Raceway**, Prairie Ronde St., Decatur, MI 49045; Chuck Nolke, (616) 423-7878  


**West Michigan R/C Racers Club**, 814 E. Railroad St., Hastings, MI 49058; Doug, (616) 948-2287 or Pat, (616) 945-3873  


## MINNESOTA

**Duey's Hobbies & R/C Raceway**, 6600 Cahill Ave., Inver Grove Heights, MN 55076; Duey Carlson, (612) 450-1721  


**Grand Rapids R/C Speedway**, 2209 Hwy 2 East, Grand Rapids, MN 55744; Aaron Voges, (218) 326-6751  


**J's Radio Control Race Park**, Rte. 2, Box 266, Starbuck, MN 56381; Jay Campbell (320) 239-4827  


**Minn-E-Golf & Hobby**, 9100 Park Ave., Elk River, MN 55330; (612) 441-8365  


**Northwoods Hobby Raceway**, 2635 Hwy 25 North, Brainerd, MN 56401; Tom Grogg, (218) 829-9257  


**Paul Bunyan Raceway**, Rte. 1, Box 468, Bemidji, MN 56664; Brad Trask, (218) 243-2749  


**Ray's Raceway Park**, 105 3rd Ave. NE, Glenwood, MN 56334; Dan Winter, (320) 634-5246  


**R/C Racing World**, 235 Main Ave. North, Harmony, MN 55939; Mark McKay, (507) 886-5931 or (507) 886-2224  


**Southside Speedway**, 2241 Marion Rd. SE, Rochester, MN 55904; Kevin Guy, (507) 281-3233  


**Time R/C Raceway**, 20 West Lake St., Chisholm, MN 55719; RV, (218) 254-4321  


**Trackside Racing**, 443 8th Ave. NW, New Brighton, MN 55112; Winton Otfelle, (612) 633-2112  


**Wild West R/C Speedway**, 2822 Piedmont Ave., Duluth, MN 55811; Roger Deloach, (218) 727-6248  


## MISSISSIPPI

**Joe McFadden Hobbies**, 1619 51st Ave., Meridian, MS 39307; Joe McFadden, (601) 483-7000  


**Small Cars Unlimited**, 820 Cooper Rd., Jackson, MS 39212; (601) 372-FAST  



## MISSOURI

**All Seasons Hobby**, 152 O'Fallon Plaza, O'Fallon, MO 63366; Bob Daniels, (314) 281-8767  


**B&L Hobbies & Raceway**, 2800 Anchor Dr., Park Hills, MO 63061; Bob Marler, (573) 431-9444  


**Fire Mountain Raceway**, 8647 Commercial Blvd., Pevely, MO 63070; Dan Gordon, (314) 475-6449  


**Greentree R/C Racepark**, St. Louis Dirt Burners R/C Club, Marshall Rd., Kirkwood, MO; (314) 831-2194  


**Ozark Mountain Speedway**, Rt. #2 Box 50, H-Highway and County Rd. 31, Noel, MO 64854; Clayton Younker (417) 475-6222  


**Ozarks R/C Raceway**, Hwy 13N, Brighton, MO 65781; Gene Rhodes or Ron Hawkins, (417) 742-4376 or (417) 742-7223  


**North Missouri Raceway**, 223 Graves St., Chillicothe, MO; Billy Johnston, (816) 646-1120  


**Real Blue Vue Speedway**, 12019 E. 47th St., Kansas City, MO 64133; Mark Randol, (816) 358-0238  


**Real R/C Raceway**, 24204 State Rt. 58, Pleasant Hill, MO 64080; Steve Hale, (816) 540-5584  


## MONTANA

**Stormer Raceway & Slot Motorplex**, P.O. Box 126 Hwy. 2 East, Glasgow, MT 59230; (406) 228-4569  



## NEBRASKA

**Goodyear Speedway and Off-Road**, 4021 North 56th, Lincoln, NE 68510; Tom or Bob, (402) 464-5172  


**Hactor R/C Raceway**, 55192 849th Rd., Norfolk, NE 68701; John Schoenauer, (402) 644-7922  


**Mr. Bill's**, 450 West 2nd St., Hastings, NE 68901; Bill J. Ries, (402) 462-4865  


**O.N.R.O.A.D.**, 3307 N. 58 St., Omaha, NE 68104; Cook Jacobs, (402) 556-8674  


**OTWG Carpet Raceway**, 55129 849th Rd., Norfolk, NE 68701; John Schoenauer, (402) 644-7922  


**RC Motorsport Off-Road Raceway**, 5600 Mass Rd., Papillion (Omaha), NE 68133; Marty Stepanek, (402) 593-6133  


**Salvation Army South Corps**, 4032 Harrison St., Omaha, NE 68164; (402) 734-3414; fax (402) 734-3415  


**Siouxland R/C Car Association**, 206 E. 13th St., South Sioux City, NE 68776; Jeff, (402) 494-1525  


## NEVADA

**Dansey's Indoor R/C & Hobbies**, 741 N. Nellis, Las Vegas, NV; David Lugo, (702) 453-RACE  



**Silver State RC Club**, 400 South Saliman #33, Carson City, NV 89701; Michael Geist, (702) 884-0375  


**Western R/C Raceway**, 6404 Richmar, Las Vegas, NV 89139; Randy Grigg, (702) 260-9222  


## NEW HAMPSHIRE

**Axis Racing R/C Dragway**, 4197 High St., Exeter, NH, 03833; Dan Peterson, (603) 659-4877  


**Economy R/C Speedway**, 4 Maple St., Winchester, NH 03470; Harold Thomas, (603) 239-4482 or 239-6470  


**Robert's Railroad & Hobbies**, 1335 1st NH Turnpike—Rt. 4, Northwood, NH 03261; Robert M. Jeffers, Jr., (603) 942-5193  


**RT 106 Racepark**, 743 Clough Mill Rd., Pembroke, NH 03275; Douglas Graves, (603) 224-RACE  


## NEW JERSEY

**America's Hobby Center Inc.**, 18300 Tonnelle Ave., North Bergen, NJ 07047; John Many, (201) 662-0777  


**Ray's American Raceway**, 142 Wilson Ave., Englishtown, NJ 07726; Ray Whitehead, (908) 446-3737  


**Family Hobbies Raceway**, 3576 N.W. Blvd. & Weymouth Rd., Vineland, NJ 08360; Linda Vogel, (609) 696-5790  


**Golden Hobbies Raceway**, 415 Erial Rd., Pine Hill, NJ 08021; John or Iona Golden, (609) 782-1822  


**Jackson R/C Racing**, P.O. Box 565, Christopher Columbus Blvd., Jackson, NJ 08527; Al Sodano, (732) 364-6422  


**Jefferson Speedway**, 5494 Berkshire Valley Rd., Oak Ridge, NJ 07438; (201) 697-7525  


**Jerry's Hobby Center & Raceway**, 336 Rt. 22W, Greenbrook, NJ 08812; Jerry or Gary, (908) 752-6030  



**LBRA Track**, 392 Warburton Pl., Long Branch, NJ 07740; (908) 222-5122  


**Millville R/C Oval**, 114 N. High St., Millville, NJ 08332; William Denstoz, (609) 327-4640  


**Pit Stop Dragway**, 100 Campus Rd., Totowa, NJ 07512; Kimberly Frank, (201) 956-7223  



**On Trax Hobbies**, 1549 Rte. 70, Browns Mills, NJ 08015; Joseph DiGirolamo, (609) 735-0422  



**R/C Shag Arena**, 690 Jendi Pkwy., Totowa, NJ 07513; Amber Beggell, (201) 956-7223  


**South Jersey Cost Controlled Racing**, 25 Jackson Lane, Sicklerville, NJ 08081; Ray Murray, (609) 629-4809  


**The Race Place**, 1151 Hwy. 33, Farmingdale, NJ 07731; John Fary, (908) 938-5215  


## NEW MEXICO

**Charlie's Hobby Shop**, 225 E. Idaho, Suite 11, Las Cruces, NM 88005; Kim or Chuck, (505) 541-1097  


**Meerscheidt R/C Raceway Park**, Meerscheidt Recreation Center, Walnut and Hadley by BMX, Las Cruces, NM 88005; Robert Heinsen (505) 526-6856 or Jim Meerscheidt (505) 523-2995; email MEERSCH@aol.com  


## NEW YORK

**BarnStormers**, MD #1 Old Oxford Rd., Chester, NY 10918; Lou (914) 469-8206  


**Beach Hill Speedway**, 1760 Beach Hill Rd., Watkins Glen, NY 14891; Jim Riley, (607) 535-2616  


**Brian's Off-Road Track**, 1124 N. Forest, Williamsville, NY 14221; Brian Was, (716) 633-8155  


Long Island Raceway, 168 Broad Hollow, Farmingdale, NY 11735; James, (516) 845-7223



The Model Shop, 1 Lakewood Ave., Monticello, NY 12071; Richard Ciminoli, (914) 791-6075



Performance Plus Radio Control Speedway/The Hobby House, 1141 1/2 Jones & Gifford Ave., Jamestown, NY 14701; (716) 488-1772



P.R.O. Speedway, 5 Washington St., Cattaraugus, NY 14719; Marc Pritchard, (716) 257-3101



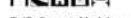
Radio Hill Raceway, 1219 Shannon Corners Rd., Dundee, NY 14837; Bill Brewer, (607) 243-8641



Rampage R/C, 27 Fuller Lane, Hyde Park, NY 12538; Brian Walker, (914) 229-1379; (914) 229-2456



R/C Competition Corner, 2413 Brewerton Rd., Mattydale, NY 13211; Lori and Cos Ciriello, (315) 455-8718



R/C Sport Hobby, 69-57 Juniper Blvd. South, Middle Village, NY 11379



R&S Hobbies, 356 Macedon Ct. Rd., Fairport, NY 14502; (716) 425-3722



Ringwood Junction, 1922 Dryden Rd., Freeville, NY 13068; Steve Miller, (607) 347-4198



Schoharie Co. R/C Car Club, P.O. Box 126, Cobleskill, NY 12043; (518) 922-6982



Southern Tier Raceway, 88 Paige St., Owego, NY 13827; Anita Harding, (607) 687-5395



South Shore Hobby & Raceway, 464 East Main St., Patchogue, NY 11772; Benny or Bonnie, (516) 758-5567



Tri County Remote Control Car Club, 33 West Decker St., Johnstown, NY 12095; Jim Sprouse, (518) 762-8884



Tri-state Area Radio Control Model Auto Club (TARMAC), 28/30 Mountain View Rd., Poughkeepsie, NY 12603; Todd (914) 342-5409; tracksite (914) 454-8276



Wall's Hobby, 2 Dwight Park Dr., Syracuse, NY 13209; (315) 453-2291



Westfield R.C. Speedway, 27 Clark St., Westfield, NY 14787; John or Jared Lindstrom, (716) 326-2339



Whitestone, 30-56 Whitestone Expy. (Dept. of Motor Vehicles), Flushing, NY 11374; Rudolf Ardilla, (718) 966-6155



ZOAR Road Speedway, 15318 Armes Ct., Gowanda, NY 14070; David & Gordon Ackler, (716) 532-9463



## NORTH CAROLINA

A&J R/C Models, 2051 Anthony Rd., Burlington, NC 27215; Jerry Loya or Andrea Thompson, (910) 227-4556; fax (910) 227-1001



Another Zito's Mobile MASCARR Inc., 412 E. Blume St., Landis, NC 28088; Carmen Esposito or Pat Youngerman, (704) 451-3293



The Antique Barn, 2810 Forest Hills Rd., Wilson, NC 27893; Steve Seidlinger, (919) 237-6778



Atlantic Coast R.C., 8-A Lockhead Ct., Greensboro, NC 27409; Charlie Higgins or Harry Johnson (910) 664-1277



Badin Shore Raceway, 1730 Jackson Lake Rd., High Point, NC 27263; Jimmy or Tim Martin, fax (910) 431-6407



C/C Hobby Speedway, 8358 U.S. Hwy. 220 Bus. N., Randleman, NC 27317; Steve & Mary Cox, (910) 495-3482



C&H Raceway, 1400 N. Cannon Blvd., Kannapolis, NC 28083; Camera & Hobby Shop, (704) 933-5321



Cape Fear Speedway, 207 Harley Rd., Wilmington, NC 28401; Bob Justice, (910) 452-2354



Carolina Dragway, 907-D Warsaw Rd., Clinton, NC 28328; (910) 592-4569



Chatham R/C Raceway, 326 Reno Sharpe Store Rd., Bear Creek, NC 27207; Dwight Fields, (919) 898-2991



Green Flag RC Raceway, 107 Harley Rd., Wilmington, NC 28401; Mike McLemore, (910) 397-0676 or (910) 452-1620



Hobby Club R/C Raceway, 1241 Buck Jones Rd., Raleigh, NC 27606; Hobby Club, (919) 460-8838



King R/C & Super Speedway, 143 Industrial Dr., P.O. Box 897, King, NC 27021; Chris Smith, (910) 983-5598 or (910) 883-3969



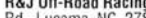
R & D Speedway, 418 Main St., Tarboro, NC 27886; John Dupree, (919) 823-2294



Ride & Slide R/C Raceway, 5319 Yaddin Rd., Fayetteville, NC 28303; Jim Woodman, (910) 425-5276 or Bill Culbertson, (910) 867-4202



R&J Off-Road Racing, 6172 Blalock Rd., Lucama, NC 27851; Robert Williams, (919) 239-0853 or Jonathan Jenkins, (919) 746-2703



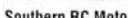
Radio Jockey's Parkway, "RJ's," Rt. 9, Box 651, Fay, NC 28301; Tony Starling, (910) 486-4820



Rosewood R/C Speedway, 651 Community Dr., Goldsboro, NC 27530; Glenn Elam, (919) 731-4734



Southern RC Motorsports Club, Hwy. 17S., Shallotte, NC 28459, P.O. Box 1651; Mark Whitt, (910) 754-4902 or Eddie Ferster, (910) 754-8528



UltraTrax, 5505 Palmers Branch, Leland, NC 28451; Mike Williams, (910) 313-0350



North Dakota



Hacienda Hills Speedway, 20 Hacienda Hills, Minot, ND 58701; Kenny Duchscherer, (701) 839-4419



Northern Mini Racers, P.O. Box 415, Minot, ND 58702; Roger Lee, (701) 839-5294



River City R/C, 2714 Main Ave., Fargo, ND 58103; Chris Hughes, (701) 235-1272



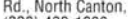
Surrey International Raceway, RR 1, Box 37, Norwich, ND 58768; Marlen Lenton, (701) 728-6760



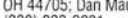
Ohio



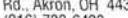
Aerotech Raceway, 409 Applegrove Rd., North Canton, OH 44720; (330) 499-1300



Dirt Trax, 2206 13th St. NE, Canton, OH 44705; Dan Mauger, (330) 833-3091



Classic Hobbies, 1994 E. Waterloo Rd., Akron, OH 44312; Walt Ellis, (216) 733-6400



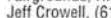
CR Raceways Emporium, 323 Center St., Ashtabula, OH 44004; Virginia Gagat, (216) 992-3833



CORCAR/Sams Club, 128 Amity Rd., Galloway, OH 43119-8732; Bill Stevenson, (614) 870-7159



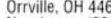
Columbus R/C Racing Club (C.R.C.R.C.), Franklin County Fairgrounds, Hilliard, OH 43026; Jeff Crowell, (614) 236-1783



D&D Hobby Center, 1344 Lexington Ave., Mansfield, OH 44907; Eric Radio (419) 756-9771



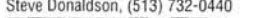
D&J R/C Raceway, 801 W. Market St., Orrville, OH 44667; Don Yoder or Mark Nussbaum, (330) 682-4266



Dirt Trax, 2206 13th St. NE, Canton, OH 44705; Dan Mauger, (330) 833-3091



Fun for All Raceway, 675 College Dr., Batavia, OH 45103; Steve Donaldson, (513) 732-0440



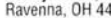
Greentown R/C Raceway, 3353 Perrydale, Greentown, OH 44630; Chuck Lambert, (330) 364-6585



Hobby Shop Raceway, 2096 Miamiburg, Centerville Rd., Centerville, OH 45459; The Hobby Shop, (937) 436-6161



Hobby World, 3499 SR 59, Ravenna, OH 44266; Tom Fry, fax (330) 296-0894



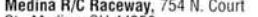
Lafferty R/C Raceway, Box 153, 70228 Hurrah St., Lafferty, OH 43951; Chris Christman, (614) 968-4818



Lakes Hobbies, 3425 Manchester Rd., Akron, OH 44314; Roy Spencer, (330) 645-6912



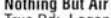
Medina R/C Raceway, 754 N. Court St., Medina, OH 44256; Bill Aholt, (216) 723-0255



Mid American Raceway, 13150 Airport Hwy., Swanton, OH 43558; Bill or Chuck, (419) 475-9459



Nothing But Air R.C. Track, 34632 True Rd., Logan, OH 43138; Gary Lloyd, (740) 385-0288



Scooters Hobby Hut, 234 Robbins Ave. #D, Niles, OH 44446; Dave "Scooter" Evans, (216) 544-9411



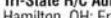
Shiray's Hobby & RC Raceway, 19930 State Route 117, Waynesfield, OH 45896; Ray Zimmerman, (419) 568-8055



TARCAR, 7216 Nebraska Ave., Toledo, OH 43617; Bill Bridges, (419) 826-3859



Tri-State R/C Auto Racers, Joyce Park, Hamilton, OH; Ernie Bauhoffer, (513) 528-2052



Van Wert R/C Raceway, 144 E. Main St. (above Hoverman Music), Van Wert, OH 45891; Mark Davis, (419) 232-2112



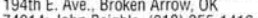
Y-City Hobby & Speedway, 120 S. 6th St., Zanesville, OH 43701; Kevin McKenna, (614) 455-3025



OKLAHOMA



Adams Creek R/C Speedway, 5207 S. 194th E. Ave., Broken Arrow, OK 74014; John Beighle, (918) 355-1416



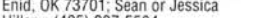
Competition R/C, 100 SE 89th, Oklahoma City, OK 73149; James or Louise Brown, (405) 634-0809



Coweta Hobby & Speedway, 310 S. Broadway, Coweta, OK 74429; Derial Seabolt, (918) 486-3948



R/C Speedway, 1401 N. Vanburan, Enid, OK 73701; Sean or Jessica Hillery, (405) 237-5504



Remote Control Race Course, 400 S. Vermont Ave., Ste. 104, Oklahoma City, OK 73108; Rick or Steve, (405) 947-RACE



Wild Country Speedway, 127 South Main, Porter, OK 74454; Charles McCollough, (918) 685-0372 or (918) 687-1686



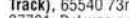
OREGON



Competition Racing Association, 17941 NE Gleason, Portland, OR 97230; Mark Taylor, (503) 761-1334



D.I.R.T. (Diamond International Race Track), 65540 73rd St., Bend, OR 97701; Daleyne and Edward Gletzt, (541) 388-2932 or 1-800-475-6040, ext. 777



Junior Vehicle Speedways, 3634 Table Rock Rd., Medford, OR 97501; (541) 664-7810



Pit Stop Hobby, 634 N. Coast Hwy., Newport, OR 97365; Richard Wood, (541) 265-2825



R/C Craze Speedway, 300 Ashland Lane, Ashland, OR 97520; Shawn Lazareff, (541) 482-4786



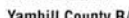
R/C Plus Hobbies Raceway, 1857 25th St. SE, Salem, OR 97302; Ron Smith, (503) 364-9188



R/C Speed Center, 2810 N. Pacific Hwy., Medford, OR 97501; Gene and Betty Jean Skelton, (541) 779-8298



Yamhill County R/C Car Club, 722 Morgan Ln., McMinnville, OR 97128; Larry Rucker, (503) 472-7234



PENNSYLVANIA



A&D's Bumps & Jumps, RR7, Box 7395C, Stroudsburg, PA 18360; Dan Ambrosio, (717) 424-1750



A&E Raceway, Latrobe 30 Plz., Latrobe, PA 15650; Bruce Parker, (412) 539-7130



Bachman's Speedway & Hobbies, Box 306, Effort, PA 18330-0306; Jeffrey Bachman, (610) 681-5845



Benders Junction Speedway, 2300 Benders Dr., Bath, PA 18014; Gerald Wambold Jr., (610) 759-0161



Brookville Hobby Shop, 170 Main St., Brookville, PA 15825; Mark Tonell, (814) 849-7385



CEB Motors R/C Div., 5743 Molly Pitcher Hwy., Marion, PA 17235; Charlie Booze, (717) 375-4635



Columbia Racing Association, 128 N. Front St., Philipsburg, PA 16866; Lurch Hammal, (814) 342-7114



Cooks Way Raceway, Cook's Way, Mt. Pleasant, PA 16666; Bob Rhodes, (412) 547-5719



Cressona Mall Speedway, Rt. 61, Pottsville, PA 17901; (717) 385-3506



DC Ultra Trax, 13 York Rd., Wycombe, PA 18974; David Cowan, (215) 672-5200



Dreamboat Hobbies, 2810 Pennsylvania Ave. W., Warren, PA 16365; Louie Dussia, (814) 723-8052



Fantasy RC's and Hobby, 2315 W. 12th St., Erie, PA 16505; Frank Francis, (814) 453-6337



Hipkin's Hobbies, 402 W. Avondale Rd., West Grove, PA 19390; Doug, (610) 869-8585



Hobby America Raceway, 5 Fitzsimmons St., Duke Center, PA 16299; Dan or Mike Coast, (814) 966-3765



Koontz's Home & Hobby Center, 1205 Hoover St., Pittsburgh, PA 15204; (412) 331-3866



Kranzel's R/C Raceway & Hobbies, 415-8 Bosler Ave., Lemoyne, PA 17043; David or Stuart Kranzel, (717) 737-7223



Little

**Willow Run R/C Raceway**, 135 Wright St., Corry, PA 16407;  
Jim Small, (814) 664-8147  
AOC

**World A.T.L.A.S./P.A.R.C.E. R/C Raceway Hobby Shop & R/C Club**, Chester Exchange Mall, 10th & Morton St., Chester, PA 19013; Darryl, Lee or Marc, (610) 874-2540  
AOC

## PUERTO RICO

**Cindra R/C Track**, Carr 7787 KM 1.6, Bo Beatriz Adentro, Cidra, Puerto Rico 00739; Humberto (Tito) Lizardi, (787) 739-1532  
AOC

**Dorado Offroad R/C Track**, Pista Atletica Bo. Higüillar, Dorado, Puerto Rico 00646; Roberto Lamoso/Jaime Ramos, (809) 796-5603 or (809) 796-1734  
AOC

**Hacienda Muñoz R/C Track**, Carr. #14, Juana Diaz, PR 00795;  
(809) 837-7083  
AOC

## RHODE ISLAND

**SK Hobbies Inc.**, 15 Carl St., Johnston, RI 02919;  
Slim or Keith, (401) 453-1440  
AOC

**Tri-State R/C Raceway**, 205 Hallene Rd., Warwick, RI 02886;  
Raymond Dean, (401) 738-4908  
AOC

## SOUTH CAROLINA

**Extreme R/C Raceway**, 5976 Grace Lane, Myrtle Beach, SC 29577; Kevin Bullock, (803) 236-2083  
AOC

**The Grove Racing Center**, 939 S. Anderson Rd., Rockhill, SC 29730;  
Mike Durham or Don Faris, (803) 327-4121  
AOC

**Hobbies and More**, 1570 S. Main St., Darlington, SC 29532;  
Jerry Pollard, (803) 393-0355  
AOC

**J&M R/C Hobbies**, 5341 Dorchester Rd., Evanston Plaza, N. Charleston, SC 29418; Mike Smith, (803) 552-9449  
AOC

**Midway Hobby and Raceway**, 707 Sulphur Springs Rd., Greenville, SC 29611; Allen A. Dodson, (864) 246-6335  
AOC

**ORA Atomic Racing Facility**, 373 Boyd Pond Rd., Aiken, SC 29803; Bill Jackson, (706) 855-0846 or (803) 642-0314  
AOC

## SOUTH DAKOTA

**Action R/C Raceway**, 107 N. Main, Mitchell, SD 57301; (605) 996-6895  
AOC

**Boomerangs Raceway**, 105 N. Main, Hartford, SD 57033;  
Ed Smithback, (605) 528-7345  
AOC

**Dakota Off-Road Racers**, 2989 W. Br. Co. 12, Aberdeen, SD 57401;  
(605) 226-0604  
AOC

**Goldtrax Raceway**, 409 E. High, Lead, SD 57754;  
Steve Brown, (605) 584-2355  
AOC

**K&B Speedway**, 27283 SD Hwy. #115, Harrisburg, SD 57032;  
Mike Kosetin, (605) 743-2582  
AOC

**R/C Action Raceway**, SE Corner at 484th & Hwy. 38, Sioux Falls, SD 57105;  
Brian Cox, (605) 373-0511  
AOC

## TENNESSEE

**D&M's Downtown Raceway**, 2703 U.S. Hwy. 411S, Maryville, TN 37303; (423) 681-8919  
AOC

**Hillside R/C Raceway**, 4194 Oakhill Rd., Dayton, TN 37321; John and Rusty Tipton, (423) 775-4739  
AOC

**Hobby Town USA**, 2000 Mallory Lane, Franklin, TN 37067;  
Bobby Mills, (615) 771-7441  
AOC

**Lawson Raceway**, 152 Joel Rd., Oliver Springs, TN 37840;  
Anthony Lawson, (206) 815-0379  
AOC

**Machine-Head Straits**, 938 Grandmere Rd., Lawrenceburg, TN 38464; Larry and Eliane Sanders, (765) 762-6630  
AOC

**MSA R/C Racing**, Rt. 12 Box 489 B, Crossville, TN 38555; D.R. Findley, (615) 456-0027  
AOC

**Sparta Raceway Park**, 32 N. Main St., Sparta, TN 38583; Carl (Buddy) Eirod, Rt. 5 Box #652, Sparta, TN 38583; (615) 836-8450 or (615) 761-3407  
AOC

**TnT Raceway**, 643 Loop Hollow Rd., New Tazewell, TN 37825; Cliff Swett, (423) 626-9065 or (423) 869-8942  
AOC

**W.O.W. Raceway**, 59 Luray Rd., Beech Bluff, TN 38313; Kelly Bean, (901) 427-7874; email: windix60@pipeline.com  
AOC

## TEXAS

**215 Speedway**, 1814 County Road 215, Abilene, TX 79602;  
Clyde Gardner, (915) 673-2351  
AOC

**Big Mike's R/C Raceway**, 1405 W. Cotton St. (behind the Locker Room), Longview, TX 75604;  
(903) 297-7814  
AOC

**Comanche Trail RC Park**, City Park, Big Spring, TX 79720; Allen Nichols, (903) 297-7814  
AOC

**Command Hobbies**, 6929 Airport Ste. 146, Austin, TX 78752;  
Tony Bermudez, (512) 458-2324  
AOC

**Drycreek Raceway**, 5903 Co. Road 2297, Quinlan, TX 75474;  
Micky Alphin, (903) 883-4060  
AOC

**Eastex Raceway**, 45000 Hwy. 59 N., New Caney, TX 77357;  
Brent Mahaffy, (713) 399-9777  
AOC

**Fastrack Raceway**, 301 Edith Drive, El Paso, TX 79924;  
Hector Gonzalez, fax (915) 779-4524  
AOC

**Flip & Spin R/C**, 5957 Jones Rd., Bryan, TX 77807; Garland Crabb, (409) 822-7311  
AOC

**Hal's Hobby Raceway**, 1440 Bessmer, El Paso, TX 79936;  
(915) 591-2213  
AOC

**The Hobby Center Raceway**, 4104 Stan Schlueter Loop, Ste. 1, Killeen, TX 76543; Lawrence Rernick, (817) 690-7311  
AOC

**Hobbycraft Speedway**, 819 N. Main St., Corsicana, TX 75110;  
Keith Hoffman, (903) 872-6761  
AOC

**Hobbytown USA**, 7676 FM 1960 W., Houston, TX 77070;  
Fred Pfafman, (713) 955-7097  
AOC

**Hobbytown USA**, 999 E. Basse Rd., Suite 177, San Antonio, TX 78209;  
Joe Sena or Clark Baisdon, (210) 829-8697; fax (210) 829-8707  
AOC

**Indy R/C World**, 220 Saturn Rd., Garland, TX 75041; Steve Webster, (214) 271-4844; fax (214) 271-4502  
AOC

**Keyser's Hobbies**, 1643 Texas, College Station, TX 77840;  
Bill Bennett, (409) 693-8095  
AOC

**MBRC Off-Road Raceway**, 204 D&E Valley Lane, Kennedale, TX 76133;  
(817) 292-5055  
AOC

**North Houston Speedway**, 11847 Spears Rd., Houston, TX 77067;  
Bob or Carol Hillin, (713) 872-2471  
AOC

**North Texas 1/2 Scale Association**, 3905 Sandia, Plano, TX 75023;  
Dean Densmore, (972) 519-0324  
AOC

**Performance Raceway**, 1106C Witte Rd., Houston, TX 77055; Jorge Tabush or Terry Schmid, (713) 464-4458  
AOC

**Rev It Up Raceway**, 3076 Kellar Rd., Smithville, TX 78957; Rev. Alton T. Edwards, (512) 360-5443  
AOC

**Rick's R/C Raceway**, 23B Scenic Loop, Boerne, TX 78000; Rick, (210) 981-2245 or Rich, (210) 590-1805  
AOC

**Rough Country**, 905 Jacksboro Hwy., Wichita Falls, TX 76301-5310;  
Robert Kerr, (817) 322-2453  
AOC

**Star/Car Raceway**, 5802 Patton St., Corpus Christi, TX 78415; Glen Stead, (512) 949-8525; Race Hotline, (512) 881-6105  
AOC

**T&T Eagle**, 161 W. Spring Creek Pkwy., #601, Plano, TX 75023;  
Tony Welborn, (214) 517-0562  
AOC

**Terminal Velocity R/C Raceway & Supply**, 200 Wallington, Ste. 223, El Paso, TX 79902; Rick or Frank, (915) 534-9198  
AOC

**Texas Speedway**, 6707 Chimney Rock, Bellaire, TX 77401  
AOC

**Tiger's Den R/C Speedway**, 702 E. Broad St., Mansfield (DFW), TX 76063; Bob Burns, (817) 477-5513  
AOC

**T.Q. Offroad Raceway**, 6236 Quail, El Paso, TX 79924; Efrén Saenz, (915) 821-7522  
AOC

**Triple Jays R/C Raceway**, Rte. 4, Box 720, Allen, TX 75002; Jeffrey Jay Johnson, (972) 562-7967  
AOC

**Warehouse Radio Controlled Raceway**, 612 W 4th St., Amarillo, TX 79101; Craig or Darren Waddell, (806) 374-6485  
AOC

**W.E.S. Hobby Race**, 980 S. Fourth St., Beaumont, TX 77701;  
Edmond Richards, (409) 839-4929  
AOC

**Wild Bill's Raceway**, 535 E. Shady Grove, Irving, TX 75060; Lynn Morgan or Tom Nix, (214) 438-9224  
AOC

## UTAH

**Intermountain R/C Raceway**, 8481 W. 2700 S., Magna, UT 84044;  
David Mott, (801) 250-8303  
AOC

**Payson R/C Raceway**, 955 South Main, Payson, UT 84651; Gus Wood, (801) 224-3852 and Lasca Wood (801) 222-8677  
AOC

**WOR Raceway**, 3170 Brinker Ave., Ogden, UT 84401; Brian Worton, (801) 393-2530  
AOC

## VERMONT

**Barre Town R/C Club**, 14 South Main St., Wall St. Complex, Barre, VT 05641; Russ Tribble or Pete Perreault, (802) 888-2860 or (802) 476-9458  
AOC

**Bradford R/C Racing**, Main St., Bradford, VT 05033;  
Seth Bean, (802) 222-9674  
AOC

**Stoughton Pond Raceway**, Stoughton Pond Rd., Perkinsville, VT 05151; Rick Adams, (802) 263-9321  
AOC

## VIRGINIA

**Bob's Hobbies & Raceway**, 7422 Brandy Creek Dr., Mechanicsville, VA 23111; Bob, (804) 746-2758  
AOC

**Brown Brothers Hobbies**, 924 North Main Street, Dumfries, VA 22026;  
Joel or Bob Brown, (703) 221-5746  
AOC

**Cooper's R/C Race Center**, 4000 Sago Rd. (969), Chatham, VA 24531;  
Norris Cooper, (804) 724-7342 or (804) 724-4182  
AOC

**DRCW Raceway**, Debbie's RC World, 2200 Commerce Parkway, Virginia Beach, VA 23454;  
Les Modlin, (757) 340-6681  
AOC

**Gloucester Scale Hobbies**, 2352 George Washington Memorial Highway, Hayes Plaza, Hayes, VA 23072; Rob Thein, (804) 642-3484  
AOC

**Hobby Hangers Speedway**, 14014 D Sullyfield Cir., Chantilly, VA 20151;  
Kwang or Billy, (703) 631-8820  
AOC

**The Hobby House**, 116 Edds Ln., Sterling, VA 20165;  
Oppie, (703) 444-0333  
AOC

**KC's Radio Control & Repair**, Rt. 4, Box 312, Trents Ferry Rd., Lynchburg, VA 24503; Curtis or Kim Wright, (804) 384-8596  
AOC

**Olde Towne Hobby Shoppe**, 9105 Center St., Manassas, VA 22110;  
Arnie Levine, (703) 369-1197  
AOC

**Race World Hobbies**, 6102 Lakeside Ave., Richmond, VA 23228;  
Larry Boyd, (804) 553-8040  
AOC

**Roadmasters/ Rick's Hobbies**, 12201 Balls Ford Ave., Manassas, VA 22110;  
Rick, (703) 330-6833  
AOC

**Shamrock Raceway**, P.O. Box 3739., Winchester, VA 22601;  
Kevin Allen, (540) 662-0403  
AOC

**Thunder Road RC Racing**, P.O. Box 1022, Troy, VA 22974-1022;  
James Palmer, (804) 589-8174  
AOC

**Trackside Hobbies**, 1920 E. Pembroke Ave., Hampton, VA 23663;  
Rick Cardwell, (757) 723-4170  
AOC

**Trainlano R/C Racing**, 5661 Shoulders Hill Rd., Suffolk, VA 23435;  
Frank Stevens, (757) 488-5454  
AOC

## WASHINGTON

**Allie's**, 108 South K St., Aberdeen, WA 98520; (360) 533-6638  
AOC

**A-Main Raceway**, 14011 NE 3rd Ct., Vancouver, WA 98685;  
Monty Coleman, (360) 571-8404  
AOC

**Burien Toyota R/C**, 15025 1st Ave., South, Seattle, WA 98148  
Ray Meek, (800) 654-6456  
AOC

**C&C Raceway**, 266 Lind Ave. NW Revton, WA 98055;  
Charles Lakin, (206) 227-5167  
AOC

**Cedardale Raceway**, 1673 Cedardale Road, Mount Vernon, WA 98273; Joe Madonia, (360) 659-0072; e-mail: getchell@halcyon.com  
AOC

**Four Season R/C Racing**, 2941 Sleater Kinney Rd. NE, Olympia, WA 98506;  
Gary and Sharon Brown, (360) 491-2430  
AOC

**Hale's R/C Raceway Park**, 10611 136th St. E. Puyallup, WA 98374; Walt Hale, (206) 845-7675  
AOC

**Hannegan Speedway**, 4212 Hannegan Rd., Bellingham, WA 98225;  
Dana Hoggarth, (360) 734-4090  
AOC

**Raceway Hobbies**, 188 Sunset Ave. S., Edmonds, WA 98020;  
Brian Bodine, (425) 774-3285  
AOC

**Schmidt's Auto Parts**, 10305 Old Hwy. 99, Marysville, WA 98271;  
Jon Faila, (206) 653-8838  
AOC

**Spokane Indoor Raceway**, 6422 E. 2nd Ave., Spokane, WA 99212;  
Dave Mapston, (509) 534-RACE  
AOC

**Tacoma R/C Raceway**, 6305 6th Ave., Tacoma, WA 98406;  
Scott Brown, (206) 565-1935  
AOC

**Tearor Raceway, Fantasy World Toy and Hobby**, 7901 S. Hosmer, Tacoma, WA 98408;  
Dave Kleinman, (206) 473-6223  
AOC

**Ultimate R/C Raceway**, 907 Cole St. #3, Enumclaw, WA 98022;  
Dan Daugherty, (360) 802-2388  
AOC

**West Coast Hobby & Raceway**, 2239 Stevens Drive, Richland, WA 99352;  
Darren Shank, (509) 375-4995  
AOC

**Zep's Hobbies & Raceway**, 530 Interlake, Moses Lake, WA 98837;  
Steve Ralph, (509) 765-8191  
AOC

## WEST VIRGINIA

**Burr-Fab Raceway**, 90 Davis St., West Union, WV 26456;  
Mark Travis, (304) 873-2487  
AOC

**Fulton's R/C Raceway**, 2646 Chapline St., Wheeling, WV 26003;  
James Fulton, (304) 233-5355  
AOC

**Left Turn Hobbies**, 100 Saco Ln. (by Post Office), Glen White, WV 25849;  
Stretch, (304) 255-3930  
AOC

**Race Zone**, Hopewell Rd., Rt. 8, Box 343A, Fairmont, WV 26554;  
Joe Clutter, (304) 368-1000  
AOC

**WVRCA R/C Club**, 142 West Main, Bridgeport, WV 26330; D.W. Weed  
AOC

## WISCONSIN

**ABC R/C Inc & Raceway**, 244 W. Main St., Waukesha, WI 53186;  
Dick Mathiesen, (414) 542-1245  
AOC

**Gary's Hobby Center**, 3701 Durand Ave., Racine, WI 53403  
Bill Phalen, (414) 554-8884  
AOC

**Heart of the Valley R/C Club**, 1330 Midway Rd., Menasha, WI 54952;  
Bill Morgan, (920) 954-1695  
AOC

**Hobbytown USA**, 2061 South Koeller, Oshkosh, WI 54901; Hobbytown USA, (414) 426-1840  
AOC

**Hobbytown USA - Revolution**, Memorial Mall, 3347 Kohler Memorial Drive, #D2, Sheboygan, WI 53081;  
Kenney, (920) 452-0801  
AOC

**JJ's Dirt Heaven Hobby and Raceway**, 6028 County Road K, New Frankville, WI 54229;  
Jeff Jansen, (920) 866-9096  
AOC

**Mid-West Tri-Clone**, 3745 Shuster, West Bend, WI 53095;  
Tom Holz, (414) 334-0429  
AOC

**Pro-Star Racing**, 726 Pine St., Green Bay, WI 54301; Chuck, (414) 494-1233 or Terry, (414) 469-5566  
AOC

**R.J.S./R.C.**, 4920 Hwy 70W, Eagle River, WI 54521;  
Randy Stys, (715) 479-2541  
AOC

**S&N's Trakside Hobbies and Raceway**, 6045 N. Green Bay Ave., Milwaukee, WI 53209; Scott Ernst, (414) 351-1910  
**A000000000**

## WYOMING

**Collectable Creations Off-Road Oval Track**, 1790 Dell Range Blvd., Cheyenne, WY 82009; Phil Severson, (307) 632-2156  
**A00000**

**Wind River R/C Racing Association**, 113 S. 3rd E., Riverton, WY 82501; Bob Belding, (307) 857-2068  
**A0000**

**Xtreme Hobbies Raceway**, 2724 Powder Basin, Gillette, WY 82718; Krieg Balls, (307) 682-6077  
**A0000000**

## ARGENTINA

**Club A. Velez Sarsfield**, Av. J.B. Justo 9000, C.P. 1408, Buenos Aires; Jorge Herrero, 54-01-658-5851  
**A000000**

## AUSTRALIA

**A.C.T. Model Car Racing Club**, offroad track—Wanniassa Raceway, Hyland Place, Wanniassa A.C.T.; indoor track—Epic Complex, Northbourne Ave., Canberra North A.C.T.; Gary Davey, 61-6-2871411  
**A00000**

**Aubry R/C Car Club**, Aubry Showgrounds, Aubry, NSW 2640; Ron Langman, 060-247-128  
**A0000**

**Canberra Off-Road Model Car Club**, Goyder St., Narrabundah, ACT 2604; Graham Brown, 61-6-241-3070  
**A0000000**

**Central Coast ORRCC**, EDSACC Sports Complex, Bateau Bay, N.S.W. Australia 2261; Peter J. Knight, 61-43-693-698  
**A000000**

**Fast n' Fun**, 250 Potreath Rd., Bellbrae West, Torquay, VIC 3228 Australia; Stephen Chara (613) 5266 1550 or (613) 5266 1556; fax (613) 5266 1556  
**A0000**

**Illawarra RCECC**, Croome Sporting Complex, Albion Park Rail, NSW 2527; Mel or Andrew, 042-714-683  
**A0000000**

**Lakeside R/C Racing Car Club**, Hollywood Dr., Lansvale, NSW 2166; R. Bartolozzi, 62-2-907-9800  
**A0000000**

**Melton Electric Circuit Car Association**, Safeway Car Parkm Corner High St. and Coburns Rd., Melton, VIC 3337; Arthur Joslin, 61-3-9747-8805  
**A0000**

**Northern Districts Model Rally Club, Inc.**, Rear Stanford Centre, 16 Stanford Way, Malaga, Western Australia 6066; G. Thirlwell, 61 (9) 249 3855; fax 61 (9) 249 4778; email tony@ois.com.au  
**A0000000**

**Penfield Park**, DSTO Complex Salisbury, Adelaide, South Australia 5108; Trevor Unsworth, (618) 8289-5010  
**A0000000**

**Templestowe Flat Track Racers**, Templestowe Reserve, Corner of Porter St. and Williamsons Rd., Templestowe, Melbourne, Victoria 31066; Renato Benci, 61 (3) 9553 4625  
**A00000**

**Wodonga R/C Car Club**, 11 Murphy St., Wodonga, VIC 3690; Ron Langman, 61-60-247-128  
**A0000**

## BELGIUM

**ATR-Alka-Tele-Racing**, 3570 Stationstraat 21, Alken Limburg; 0032-11-25-49-03  
**A000000**

**Cartroubles Indoor Buggy Track**, Jan Moonstraat 52-56, 2160 Wommegem, Belgium; Guy Ermes, 32-3-326-51-15; fax 32-3-326-51-01  
**A0000000**

**MBV-Kampenhout**, Teniersin 28, Kampenhout B1910, Belgium; Frank Mostrey, phone and fax 0-16-65-75-18  
**A000000000**

**MRCZ**, Centrum, De Burg, Belgium; Montie, 75-71-63  
**A00000000**

**Model Racing Club Oudenaarde**, Scheldekant, 9700 Oudenaarde, Belgium; A. Chanterle, 32-55-31-36-48; fax 32-55-30-19-12  
**A000000**

**R.C.R.**, Peilstraat 43, Retie 2470, Belgium; A. Eelen, phone and fax 32-14-379685  
**A0000000**

## BRAZIL

**Amoc Cassacoçao de Modelismo B. Camborio**, Junto ao Par Que Ecologico de Bal. Camborio, Bal. Camborio, S.C. 86.330-000; Leo Cesar, (047) 366-0001  
**A000000**

**Brasilia R/C Motor Circuit**, Estacionamento do Estadio Mane Guarrichina, Brasilia, DF 70000, Brazil; Alexandre (Alex), 55-061-273-7205  
**A000000**

**Hobby Center**, SQS 210 Bl.H Apt. 204, Brasilia, DF-Brasil 70.273; 061-242-0488  
**A000000**

**Hobby Planet Racing Club**, Rod Dom Pedro 1, KM 1315, Campinas, Sao Paulo, Brasil 13091901; Daniel, Helio, Luciano, 019 258 2768  
**A0000000**

**Jungle Drive**, Rua Alberto Maranhao, No. 219 Icha do Gov. Rio de Janeiro, 21940-490; Paulo Brito (021) 396-0851 or (021) 393-7449  
**A0000**

**MP Raceway**, AV. Nacoes Unidas, 6815 Lapa, Sao Paulo; Gerd Heitrotter, 55-11-9819039; www.hpraceway.com.br  
**A0000000**

**Off Roaders**, Av. Guilherme Dummont Villars, 317, Sao Paulo, CEP 05640; Waldir Ielpo, (055) 011-260-5628; fax (055) 011-831-4931  
**A0000**

**Way of R/C Off-Road Cerrado**, Rua Paraiba 1323, 1st floor, Belo Horizonte, Minas Gerais; Claudio T. Corrae, (031) 227-6111, fax (031) 227-6869  
**A0000000**

## CANADA

**Action Weelz**, 462 Turcotte, Vanier, Quebec, G1M 1R6; Regent Tardif, (418) 527-5756  
**A0000000**

**Advance R/C Raceway**, 4181 Sheppard Ave. E., Scarborough, Ontario M1S 1T3; Albert Lau, (416) 321-8377  
**A0000000**

**A&J Toronto R/C Raceway**, 24 Main St., Building B, Unionville, Ontario L3R 2E4; (905) 305-1479  
**A0000000000**

**The All New R.C. World**, 2633 Hwy. #6, Mt. Hope, Hamilton, Ontario L0R 1W0; Dave, (905) 765-2301, Larry, (905) 333-3297 or Brian, (519) 752-0044  
**A0000000**

**ATN**, Auto Teleguide Nicolet, 2000 Rue Paul Hubert, Saint-Jean-Baptiste-de-Nicolet, Quebec J3T 1E5; Louis Durand, (819) 293-6097  
**A0000000**

**Auto Sprint**, 6065 Des Grands Prairies, St. Leonard, Quebec H3G 2R6; David Kalayjian, (514) 287-3503  
**A0000000**

**Circuit J.C.**, 1283 Chemin, St. Philippe, St Polycarpe, Quebec J0P 1X0; Jean Castellan, (514) 265-3675  
**A000000**

**Circuit Pepsi**, Centre de Location, 37 du Roi, Sorel, Quebec, (514) 746-8628  
**A0000000**

**Circuit Plessis**, 260 Rang 9 Ouest, Plessisville, Quebec G6L-2Y2; (819) 362-3743  
**A0000**

**Circuit R/C Pro**, 1500 Chemin Sullivan, Val d'Or, Quebec; J9P 1M1; R/C Modeler Plus, (819) 874-3918  
**A0000000**

**Circuit Teleguide St. Roch**, 363-B St. Charles, St. Roch De L'achigan, Quebec J0K 3H0; (514) 588-4254, fax (514) 588-6554  
**A000000000**

**Circuit Teleguide Grand Prix**, 9600 Ignace, Ste. C. brossard, Quebec J4Y 2R4; (514) 444-1286  
**A0000000**

**Club Avatt**, 244Jules-Richard, Deauville, Quebec J1N 3; Daniel Vanier, (819) 864-6262  
**A000000**

**Club RCSI**, 44 Rue Holliday, Sept-Iles, Quebec G4R; Sylvio Gerard, (418) 968-6575; Hobby Shop, (418) 962-6565  
**A00000000**

**CRCCC**, Box 309, Clinton, Ontario N0M 1L0; Eric Russell, (519) 482-9429  
**A0000**

**CTG**, 450 Chemin de la Grand Ligne, Granby, Quebec; (514) 358-4419  
**A0000000**

**CTL**, 495 Industriel, Longueuil, Quebec; (514) 358-4419  
**A0000000**

**Dustkickers R/C Raceway**, 1785 Cypress Rd., Quesnel, British Columbia V2J 4B1; Darrell Dinsdale, (250) 747-2680  
**A00000**

**Dynamic Hobbies**, 21 Concourse Gate, Unit 6, Nepean, Ontario, K2E7S4; Clark Freeman, (613) 225-9634  
**A0000000000**

**East Coast Model Center Raceway**, 13 Glen Stewart Dr., Ste 1, Southport, Prince Edward Island C1A 8X9 Gary Stephen, (902) 569-3262  
**A00000000**

**Evolution Speedway**, 1935 Glengrove Rd., Pickering, Ontario L1V 1X3; Eric Lang, (905) 839-2084  
**A0000**

**Fast-Trax Speedway**, RR 4, Trenton, Ontario; Russ McPeak, (613) 394-6411  
**A0000000**

**Fly 'N Bryan's Radical Raceway & Little Shop of Hobbies**, RR #1, Ste. 12, Comp. 49, Chase, British Columbia, Canada V0E 1M0; Bryan Coffey/ Dani Potvin, (604) 955-0669  
**A0000000**

**Gilles Comtois**, 1458, boul. Lafleche, Bale-Comeau, Quebec, G5C 1E1; (418) 295-1830  
**A0000**

**Honda House Motor Speedway**, 384 Richmond St., Chatham, Ontario N7M 1P9; John Elliot, (519) 354-5530  
**A0000000**

**Interior R/C Raceway**, 34-1605 Summit Dr., Kamloops, BC, V2E 2A5; Martin Vanhieuwenhuizen, (604) 374-1268 or (604) 374-8458  
**A00000000**

**J-T International Raceway**, 127 Milligan Lane, Nanaimo, Ontario K7R 8A1; N. O'Neill, (613) 354-0099  
**A00000000**

**Leading Edge R/C Speedway**, 731 Gardiners Rd., Kingston, Ontario K7M 3Y5, Canada; Mike and Tony Daicar, (613) 389-4878  
**A0000000000**

**Mid-Canada R/C Speedway**, 1678 St. James St., Winnipeg, Manitoba R3H 0L3; Richard Driedger, (204) 339-6566  
**A00000000**

**Miniatures & Passions**, 204 St. Charles, #103, Ste. Therese, Quebec, Canada J7E 2 B4; Gilles Lachance, (514) 979-7989  
**A0000**

**MORRAC Raceway**, 6449 Crowchild Tr. SW., Box 36060, Calgary, Alberta T3E 7C8; (403) 254-1386  
**A0000**

**Off-Road R/C Raceway**, 76 Eddystone Ave., North York, Ontario M3N-1H4; Ron Lefebvre, (416) 740-0536  
**A0000000**

**Prince George Radio Controlled Car Club**, 202 Explorer Cres., Prince George, B.C. Y2M5R8; Doug Waller, (604) 561-0035  
**A0000**

**Quintrax Speedway**, 610 Dundas St. East, Belleville, Ontario K7K 2M1; (613) 962-1414; fax (613) 962-7306  
**A000000000**

**Randy Shantz Raceway**, 1015 W. 14th St., North Vancouver, British Columbia; Steve Mulhall, (604) 945-3888  
**A00000**

**R/C Champ Raceway**, 670 Progress Ave., Rear Unit #13-16; Scarborough, Ontario, M1H 3A4; Ben, Matthew or Louie (416) 289-8717  
**A0000000**

**Recreation R/C Raceway**, Hwy 16 and Ferry Ave., Prince George, BC; Doug Waller, (604) 561-0035  
**A0000**

**Ronbo's R/C Racing**, RR 1 Glen Walter, Cornwall, Ontario K6H 3G4 Ron Giroux, (613) 936-0176  
**A0000000**

**Rousillon Hobby Track**, 177-D St-Jean Baptiste, Chateauguay, Quebec J6K 3B4; (514) 698-2151  
**A0000000**

**Sheldon's Raceway**, Box 597, Cutknife, Saskatchewan; Sheldon Bradlow, 398-2232  
**A0000**

**Spinnin Wheel Raceway**, RR 1, Ariss, Ontario N0B 1B0; (519) 824-1614  
**A0000**

**South Okanagan Roadhogs**, Skha Lake Rd., Penticton, BC; Willie Lemm, (604) 492-5698  
**A0000**

**Steeltown Speedway**, 3580 Kirk Road West, Binbrook, Ontario L0R 1C0; Paul Snyder, (905) 227-7508  
**A0000**

**Strathclair Park**, Old Garden River Rd., Sault Ste. Marie, Ontario P6A 5T1; (705) 759-1855  
**A0000**

**Sudbury Organized Auto Racing**, 765 Barrydowne Rd., Sudbury, Ontario P3A 3T6; Ken Moore, (705) 524-5339  
**A0000000**

**Thunder Alley Raceway**, Lambton Mall, 1380 London Rd., Sarnia, Ontario N7S 1P8; Rob Smith, (519) 882-3361  
**A0000000**

**Vancouver R/C Road Racers**, #100-2733 Barney Hwy., Coquitlam, British Columbia V3E1K9; Roger Brown, (604) 945-3888  
**A0000**

## COLOMBIA

**Club De Automodelismo Colombiano**, Centro Recreativo Catam, Kilometro 14 Autopista Norte, Santafe De Bogota, D.C. Colombia; Jorge Delgado, 1-6130588  
**A0000000**

**Club De Automodelismo Colombiano**, Centro Comercial Guaymaral, Kilometro 16 Autopista Norte, Santafe De Bogota, D.C. Colombia; Jorge Delgado, 1-6130588  
**A0000000**

**Garoso Raceway**, Avenida Libertadores con Diagonal Gran Colombia, Cucuta, Colombia; Gabriel Rodriguez, 975-751892  
**A00000000**

## CYPRUS

**Racing Model Club**, Kennedy Ave. N. 42, Nicosia, Cyprus; Andrea Sotiriou, 493186; fax 493229  
**A000000**

## DENMARK

**Brondby Motor Club**, Roskildevej 460 Brondby, Denmark 2605; Soren Boy Holst, 45-36-472-462  
**A00000000**

**Holstebro R/C Buggy Club**, Mozartsvej 7500 Holstebro, Denmark 2600; Michael Brushholt, 45-97-412-734  
**A0000000**

**Klub 144 Raceway**, Bagsvaerdvej 144A, 2800 Lyngby, Denmark; Henrik Carstens, 45-42-88-3691  
**A00000**

**Rainbow Raceway**, Eriksvej, 9 Glostrup, Copenhagen 2600; P. Christiansen, 45-52-848-504  
**A0000000**

**Thor Minirace Odense**, Sohusevej 255, Alleso, Odense, Behind Alessio Hallen (Sport Centre), Odense, Denmark; Ulrich Rasmussen, 45-65-303-707  
**A000000**

## DOMINICAN REP.

**Adoca R/C Speedway**, Feria Ganadera, Santo Domingo; (809) 220-5266  
**A000000**

**La Barranquita R/C International Speedway**, Santiago; (809) 582-2303  
**A000000**

## ECUADOR

**Hobby Centro A.C.R.O. Club**, Via a Turi Km 0.5, Cuenca-Ecuador, Teddy Jaramillo, 593-7-831-289; fax 593-7-817082  
**A000000**

## ENGLAND

**Chessington Radio Car Club**, Surbiton Sport Club, Riverhill Estate, Worcester Park Rd., Worcester Park, Surrey; Ian Spiller, 0252-20657  
**A0000000**

**Hampshire Racing Center**, Viabes Craft Center, Basingstoke, Hampshire; Tony Eudola 44-1276-61402  
**A000000**

**Hinckley RCCC**, Three Pots Inn, A5 Watling St., Hinckley, Leicestershire; Bruce, 01455-890580  
**A000000**

**Worcester Model Car Club**, Christopher Whitehead High School, Bromwich Rd., St. John's, Worcester WR2 609; Mr. Hardy  
**A000000**

## FRANCE

**Auto Model Club de l'ouest**, 45 rue de Menez, Lorient, France 29470; Peuziat Michel, 02-98071764  
**A0000000**

**Auto Electron**, 35, rue B. de Ventadour, Limoges, France 87000; M. Boudoul, 55 062763  
**A0000000**

**Crame Roncq**, 64 rue du Becquerel, 59370 Mons el Baroeul; Michael Hondekyin, 33-20042755  
**A0000000**

**CSRM**, 17 Grande Rue Ave., de Saint-Rambert, 69009 Lyon; Pierre-Yves Monfroy, 06 78880852  
**A0000000**

**Lorgies Bolides**, rue Beau-Riz, 62840 Lorgies, France; Mme. Hourdequin Sabine  
**A0000000**

## GERMANY

**Dreykorn Raceway**, Heuchlinger-Hauptstr. 43, Lauf, 91207; Hermann Hensel, 09123-81457  
**A0000000**

**MC Köln**, Bottgerstr., Worringen, Germany 50769; Ralf Habel, 02733-477493  
**A0000000**

**Mini Car Club Dortmund**, Kortschstr. 4, 4600 Dortmund 13, Germany; Roland Schwan, 0231/213609  
**A0000**

**Oberhausen-Altstaden**, Am Fserderturm., Oberhausen, Germany 46099; Josef Holl, 0208-403676  
**A000000**

**Panik Raceway**, Teutonen Str. 5, Troisdorf, Germany 53844; Guido Kraft, 0224-400259  
**A000000**

## GREECE

**EORA-Fanatik Racing**, 20 Irinis Ave., Pefki, Athens 15121; Mr. T. Diamandakis, 8025556  
**A0000000**

## GUAM

**R/C International Raceway**, P.O. Box GK, Agaña; Robert (Buddy) Simpkins, (671) 477-3207  
**A0000000**

## HONDURAS

**Autodromo Accion**, Quinta Santa Maria, San Pedro Sula, Honduras, Colonia Rivera Hernandez; Eduardo Hondal, (504) 52-2061



## HONG KONG

**H.K.R.C. Model Car Racing Club**, Lot 2130-2137, Ko Po Tsuen, Sha Tau Kok Rd., N.T., Hong Kong; Alex Chan, (852) 659-2822

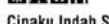


**Kingsville Buggy Arena**, Wong Chuk Yeung Village, Shatin, N.T.; Pak Yeung, (852) 607-0828



## INDONESIA

**1st Circuit**, Kompleks Villa, Kalijuduh Indah, Surabaya; 62-31-5681965



**Cipaku Indah Speedway**, J1 Cipaku Indah II/2, Bandung 40143, Indonesia; Cipaku Indah Hotel, Brad Lake, 62-22-210219



**Karinda Off-Road R/C Car Model Circuit**, Perumahan Bumi Karang Indah, J1 Karang Tengah Rayam lebak bulus, Jakarta-Selatan 12440; Wivied W. Soudarmadi, 62-21-7900878



**Pondok Cabecircuit**, J.L. Kunir No. 83, Pondok Cabe, Ciputat, Jakarta, Indonesia; Ali Agus Salim, 7403568-9; fax 7491533



**Sentul World Hobbies**, Citeureup Bogor Jawa Barat, Indonesia; International Circuit Hilton Hartanto, lan Sentul International Sirkuit, KM 42 62-21-751-2439



## ISRAEL

**Ircca Off-Road**, Rahanana, Israel; Yaron Zafris, (972) 030549937



**Nahshoneat**, Abba Nilef Silver Str. 64, Haifa, Israel 32809; Golan Levy, (972) 039386444 or (972) 04231252



## ITALY

**Associazione Modellisti Cossato**, via P. Maffei, Cossato 13014, Biella, Italy; Zanellato Romildo, 015-405881; fax 015-922709



## JAPAN

**Courtney Off-Road**, Camp S.D. Butler, Okinawa, Japan, FPO AP 96379; USMC Arts & Crafts, 81-61173-53674



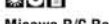
**Foster R/C Raceway**, Camp S.D. Butler, Okinawa, Japan, FPO AP 96379; Camp Foster Arts & Crafts, 81-61173-53674



**Hansen Off-Road**, Camp S.D. Butler, Okinawa, Japan, FPO AP 96379; USMC Arts & Crafts, 81-61173-53674



**Iwakuni R/C Track**, PSC 561, Box 978, FPO AP 96310-0978; David T. Eck, 81-6117-53-3662



**Misawa R/C Raceway**, PSC 76, Box 2946, APO AP 96139-2946; Terry Brancheau, 81-17653-5181 ext. 222-5324



**Yokota R/C Racers**, PSC #78, Box 4274 APO AP 96326, Tokyo, Japan; Brad Johnson, 011-813-11-757-7655



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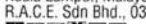
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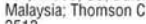


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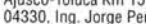
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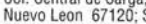
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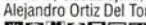
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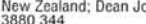
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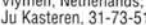
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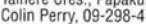
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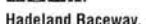


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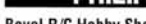
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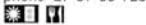


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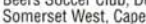
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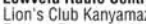
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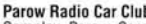
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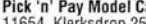
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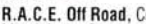
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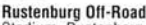
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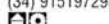
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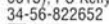
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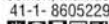


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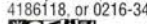


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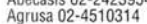


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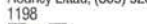


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## R/C Show Stompers

**H**ector Aponte (remember him? He's the creator of the awesome Mongoose featured in our February '98 issue) and his "Team Crusher" friends put on a three-day show of "R/C mayhem," as he calls it, before a crowd of 20,000 at the Nassau Coliseum Monster Jam. Hector's Mongoose Ford, Paul Glut's Ford Big Foot, Mike Mavrikakis' New Era 1/4-scale Carolina Crusher and Anthony Luciano's Super Foot opened the show with a 15-minute R/C exhibition on Friday, Saturday and Sunday and repeated the routine during every intermission. Unfortunately, Anthony could not make it on Sunday and missed the group photo session.

According to Hector, "We had the crowd applauding during our mayhem of doing jumps and spinning dirt donuts, and they really loved the Mongoose crushing full-scale cars. It was like watching Bob Chandler and Bigfoot perform in 1974! We hung out and serviced our trucks in the room where all the full-scale crushers such as Bigfoot, Carolina Crusher and Monster Patrol were. The full-scale guys were great and loved the fact that *R/C Car Action* is proud to feature R/C monster trucks. The kids would yell, "Hey, Mongoose; can I have an autograph?" I signed 25 autographs, many on February issues of *R/C Car Action* brought to the show. Pace Motor Sports, the promoter of the show, has invited us back to the 1999 Monster Jam event!"

If any of you cravers of the crush wish to contact Hector, here's his email address: [hachassis@worldnet.att.net](mailto:hachassis@worldnet.att.net).

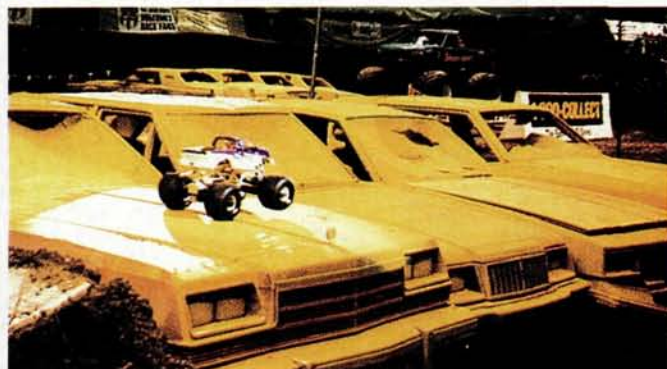


*Something for everyone. Hector Aponte's 1/10-scale Mongoose on top of Mike Mavrikakis' 1/4-scale Carolina Crusher with the full-scale Carolina Crusher in the background. The 1/4-scale Crusher tips the scales at 70 pounds and sports a servo that puts out 5,000 oz.-in. of torque (it's used in the film industry for robots)!*



*Hector is interviewed by the Pace Motor Sports MC.*

*From right: Hector Aponte, Paul Glut and Mike Mavrikakis. Unfortunately, Anthony Luciano couldn't be there on Sunday, so he missed the group shot.*



*Above: Hector's Mongoose does some ninja crushing on full-scale victims. Ninja crushing is when you leave no "footprints" behind. Left: big Bigfoot—little Big Foot.*

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 Lobby Intl. (see address below).

Great Planes Model Distributors,  
 2904 Research Rd., P.O. Box  
 9021, Champaign, IL 61826-9021;  
 (217) 398-6300; fax (217)  
 398-1104.

Futaba Corp. of America, P.O. Box  
 19767, Irvine, CA 92723-9767;  
 (714) 455-9888; fax (714)  
 455-9899.

GHI, 2374 N. Orange Mall,  
 Orange, CA 92865; (714)  
 921-0322; fax (714) 921-0380.

Hammad Ghuman, 6 Tower  
 Heights, Albany, NY 12211;  
 (518) 458-8441.

Hitec/RCD Inc., 10729  
 Wheatlands Ave., Ste. C, Santee,  
 CA 92071-2854; (619) 258-4940;  
 fax (619) 449-1002; website:  
<http://www.hitecrd.com>.

Hobby Lobby Intl., 5614 Franklin  
 Pike Cir., Brentwood, TN 37027;  
 (615) 373-1444; fax (615)  
 377-6948; website:  
<http://www.hobby-lobby.com>.

Horizon Hobby Distributors, 4105  
 Fieldstone Rd., Champaign, IL  
 61821; (217) 355-9511; fax (217)  
 352-0355; [www.horizonhobby.com](http://www.horizonhobby.com).

HPI, 15321 Barranca Pky., Irvine,  
 CA 92618; (714) 753-1099;  
 fax (714) 753-1098.

Irrgang Racing Service (IRS), 18  
 Cannon Rd., Milway, NJ 08340;  
 phone/fax (609) 476-2371.

JR Radio; distributed by Horizon  
 Hobby Distributors (see address  
 above).

Kimbrough Products, 1322 Bell  
 Ave., Unit 1-C, Tustin, CA 92780;  
 (714) 258-7425; fax (714)  
 258-7426.

Kyosho/Great Planes Model  
 Distributors, P.O. Box 9021,  
 Champaign, IL 61826-9021; (217)  
 398-6300; fax (217) 398-1104.

Loctite Corp., 18731 Cranwood  
 Ct., Cleveland, OH 44128; (216)  
 475-3600.

Lunsford Racing, 2500 Three  
 Lakes Rd., Ste. A, Albany, OR  
 97321; (541) 928-0587; fax (541)  
 967-5917.

MIP, 746 E. Edna Place, Covina,  
 CA 91723; (626) 339-9008;  
 fax (626) 966-2901.

MonoKote; distributed by Great  
 Planes (see address above).

Mugen-Seiki, 22600-A Lambert,  
 Unit 704, Lake Forest, CA 92630;  
 (714) 855-6993; fax (714)  
 855-6994.

Niftech, 5565 Wilson Dr., Mentor,  
 OH 44060; (216) 257-6018;  
 fax (216) 257-4281.

Novak Electronics Inc., 18910  
 Teller Ave., Irvine, CA 92612;  
 (714) 833-8873; (714) 833-1631.

OPS Engines; distributed by  
 Great Planes (see address  
 above).

O.S.; distributed by Great Planes  
 (see address above).

Parma PSE 13927 Progress Pky.,  
 North Royalton, OH 44133; (216)  
 237-8650; fax (216) 237-6333.

Pegasus Hobbies; fax (909)  
 949-6805 (no direct sales).

Pro-Match Competition Batteries,  
 2033 S. Palo Verde Blvd., Lake  
 Havasu City, AZ 86404; (520)  
 855-2226.

Protoform Inc., P.O. Box 456,  
 Beaumont, CA 92223; (909)  
 849-9781; fax (909) 849-2968.

RAm (Radio Controlled Models  
 Inc.), 229 E. Rollins Rd., Round  
 Lake Beach, IL 60073; (847)  
 740-8726; fax (847) 740-8727.

R/C Neon; distributed by Varad  
 Corp., 17902 Star of India Ln.,  
 Carson, CA 90746.

Reedy Modifieds/Team  
 Associated, 3585 Cadillac Ave.,  
 Costa Mesa, CA 92626; (714)  
 850-9342; fax (714) 850-1744.

RPM Inc., 14978 Sierra Bonita Ln.,  
 Chino, CA 91710; (909) 393-0366;  
 fax (909) 393-0465.

Sanyo, 2055 Sanyo Ave., San  
 Diego, CA 92173; (619) 661-6620;  
 fax (619) 661-6743.

Sermos RC Snap Connectors Inc.,  
 Cedar Corners Stn., Box 16787,  
 Stamford, CT 06905; (203)  
 322-6294.

Tamiya America Inc., 2 Orion,  
 Aliso Viejo, CA 92656-4200; (800)  
 TAMIYA-A; fax (714) 362-2250;  
[www.tamiya.com](http://www.tamiya.com).

Team Losi, 13848 Magnolia Ave.,  
 Chino, CA 91710; (909) 465-9400;  
 fax (909) 590-1496; website:  
[www.teamlosi.com](http://www.teamlosi.com).

Tekin Electronics, 940 Calle  
 Negocio, San Clemente, CA  
 92673; (714) 498-9518;  
 fax (714) 498-6339.

Traxxas Corp., 12150 Shiloh Rd.,  
 #120, Dallas, TX 75228; (972)  
 613-3300; fax (972) 613-3599.

TRC; distributed by Trinity  
 Products (see address below).

Trinity Products Inc., 36 Meridian  
 Rd., Edison, NJ 08820; (732) 635-  
 1600; fax (732) 635-1640; web-  
 site: [www.teamtrinity.com](http://www.teamtrinity.com).

Yankee; distributed by CEC  
 (see address above)

Yokomo USA, Airport Business  
 Center, 17951 Skypark Cir., Ste. K,  
 Irvine, CA 92614; (714) 252-8663;  
 fax (714) 252-8657.